diesel power

JUNE 1960

Herbert G. Thayer, *Superintendent, Geneseo Municipal Power Plant, Geneseo, Illinois, explains...*

How Geneseo plant offset rising costs with Cooper-Bessemer power system

"In the face of rising fuel and labor costs, our utility has held the line on costs and rates, thanks to modern, automatic-controlled gas-diesel facilities.

"Backbone of our expanded plant," says Mr. Thayer, "is a Cooper-Bessemer LSV 12-cylinder, turbocharged gas-diesel engine and En-Tronic® control. In the year following installation of this equipment, we reduced operating expenses $21,000. The new Cooper-Bessemer engine, rated 2680 hp at 327 rpm, showed a yearly efficiency of 8.5% higher than the previous over-all plant efficiency."

When you start to plan power facilities, it will pay you to call in the nearby Cooper-Bessemer engineer for assistance on engine and automatic controls requirements.

BRANCH OFFICES: Grove City • New York • Washington Gloucester • Pittsburgh • Chicago • Minneapolis • St. Louis • Kansas City • Tulsa • New Orleans • Shreveport • Houston • Greggton • Dallas Odessa • Pampa • Casper • Seattle • San Francisco • Los Angeles

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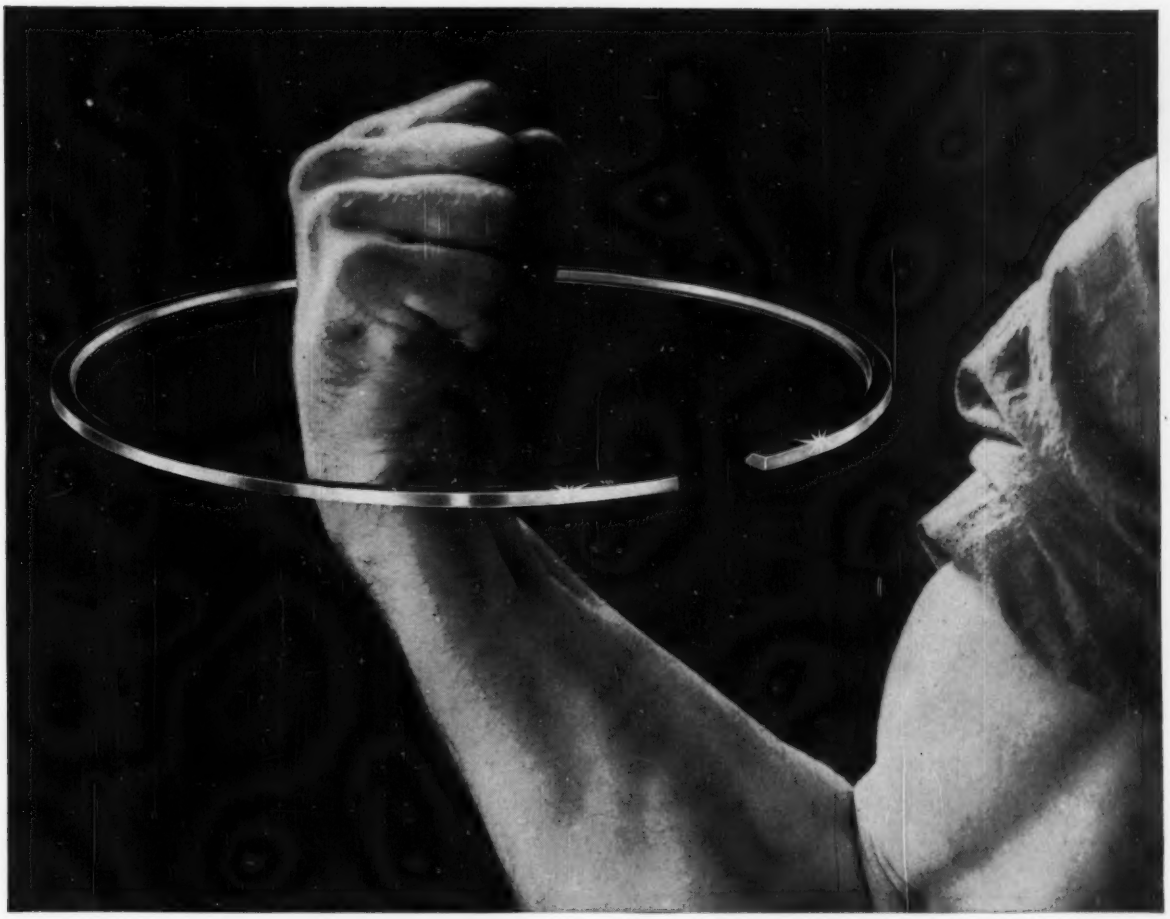
ENGINES: GAS - DIESEL - GAS-DIESEL
COMPRESSORS: RECIPROCATING AND CENTRIFUGAL, ENGINE, TURBINE OR MOTOR DRIVEN



PEDRICK PUTS "MUSCLE" IN TOP GROOVE RINGS

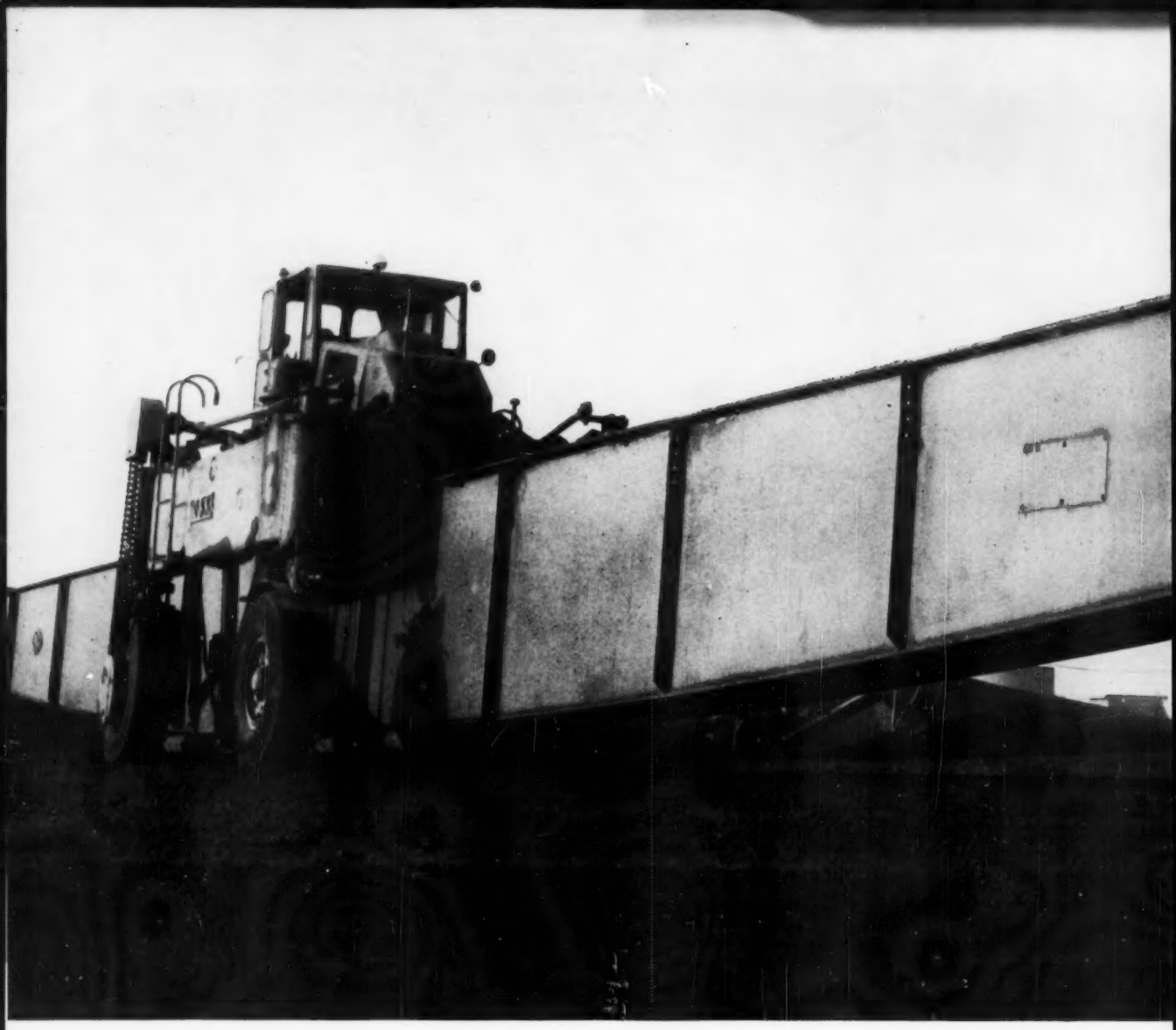
"Excelloy"—a remarkable Pedrick-developed piston ring alloy—is specifically designed to put "muscle" in top groove rings and end the problem of breakage. *Twice as strong* as regular piston ring iron, "Excelloy" has a dense, uniform structure that combines toughness and resiliency with a very high tensile strength and resistance to heat. In addition, Pedrick "Excelloy" Rings have an extra-heavy chrome facing, for most installations, to provide up to *four times longer* ring life.

Whatever your engine or type of service, you can count on top ring performance when you use "Excelloy" chrome-plated rings—*twice as strong . . . with four times longer life.*

Use Pedrick's experienced engineering service for consultation on all your piston ring problems. WILKENING MANUFACTURING CO., Philadelphia 42, Pa. In Canada: Wilkening Manufacturing Co. (Canada) Ltd., Toronto 2.

Pedrick PISTON RINGS

PEDRICK PIONEERED *Conformable* RINGS FOR BIG-BORE ENGINES



"We've installed 25 of the new lightweight, low-

... and maintenance records to date indicate

The Timken Roller Bearing Company is a long-time user of Hercules diesels. In fact, one of the Ross carriers purchased by the firm for a fleet now numbering 20 is powered with a Hercules diesel that has logged more than 17,000 trouble-free hours to date—with only normal preventive maintenance. With this kind of experience, the Timken Company was quick to investigate the new Hercules diesel line when it was released.

Some 25 of the new Hercules engines, ranging from three cylinder sizes to the large, six-cylinder, multi-fuel D-426, are installed in materials handling equipment serving the firm's Steel & Tube Division. Many of these engines have compiled service records of over 2000 hours, with negligible service expense. They give plenty of power for the job, too, even though many of them have replaced heavier, larger displacement diesels.

"If present indications are a guide," says Ed Gumpf, "these new Hercules diesels will be the best investment, in terms of engine-cost-per-hour-of-service, that we've ever made."

The new Hercules diesels, available in a range from 50 to 175 horsepower, are proving more economical to buy and less costly to own for many engine users.

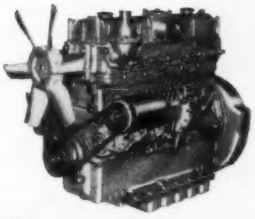
For complete details, call the Hercules distributor near you or return the coupon, at right, to Hercules Motors Corp., Canton 2, Ohio.

cost Hercules Diesels in our equipment

they will save us money"

says Ed Gumpf, Supt. of Materials Handling, Steel & Tube Division, The Timken Roller Bearing Co.

Hercules D-426 Poly-diesel engine can burn diesel fuel, gasoline, kerosene, even JP-4, interchangeably.



HERCULES

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Hercules Motors Corp.
Canton 2, Ohio

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HIGHER PERFORMANCE WITH SMALLER TURBOCHARGERS

AiResearch's new line of high performance turbochargers gives higher air pressures and more flow per size and weight than ever before achieved in the turbocharging industry, while retaining the high standards of durability which AiResearch established in this field.

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Other advantages:

Lower Cost—Radically simplified design and high production tooling have significantly lowered unit cost and service requirements.

Faster Response—Lowered inertia of the rotating group has made response almost immediate.

Greater Versatility—Interchangeable compressor components for each basic turbocharger housing permit a perfect matching of turbocharger to the job; and better engine matching further reduces operating cost.

These new, high performance turbochargers are readily adapted to AiResearch turbocharger control systems which insure optimum engine characteristics over the entire range.

World leader in the development and manufacture of lightweight turbomachinery of all types, AiResearch now has more than 35,000 turbochargers in the field delivering nearly 9 million turbocharged horsepower.

Your inquiries are invited.

THE GARRETT CORPORATION

AiResearch Industrial Division

9225 South Aviation Blvd., Los Angeles 45, California

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND SPECIALIZED INDUSTRIAL PRODUCTS

editor's notes...

You'll want to read about...

Dieselman Charlie Zache has his hands full of responsibilities. There're 21 big 40-ton trucks — Euclids and Darts — that depend on his skilled knowledge. These trucks operate 3-shifts, 24-hours-a-day! Keeping 'em running is his job . . . buying what goes into 'em is part of that job, too. You'll find this story on page 24.

More and more toll roads are relaxing their truck weight-and-length regulations, allowing the big combination Double Bottoms to roll. But trucks on these super highways have to maintain minimum on-the-level and on-the-grade speeds. Means that tractors have to (or should) be converted to get maximum speed possible at top allowable weights. Our story on Page 26 describes how one Midwestern trucker—Cooper-Jarrett—customized their tractors.

What's it like to drill an oil well up in Alaska five-miles from the Bering glacier? Well, that's our story on Page 29 . . . three big Waukeshas supply the power. Fuel, spare parts and vittles are all being flown in.

Our Editor drives a Mercedes-Benz 180D. What kind of engine's under its hood? Diesel, of course! Starting on Page 30 is another of his continuing reports on its performance. You'll learn how he solved the mystery of where the oil went . . . he'll even take you for a ride up his "dynamometer hill". All the facts and figures on operating a diesel car are here.

Don't miss our New Products and New Literature pages — they're chock-full of items designed to make your job easier. Remember to use our Reader Service Card for additional information!

You'll want to read about...

We had a talk with Clarence Soderberg, superintendent of maintenance for Asbury Transportation Company of Los Angeles last month. We asked some searching questions about his Cummins JN-130-powered International diesel tractors. They're being used for short-haul work in Los Angeles, averaging 8.5 and 9.75 mpg! We think you'll be interested in Clarence's answers. Story's on Page 34.

Frozen foods are making life easier for our wives—but keeping food cold en-route to the supermarket presents some problems for today's "reefer" operator. To learn more about this growing market for small diesel engines, we paid a visit to Transicold Corporation out in California. Transicold is using the Perkins Four-99 (35-hp) to power their generator-compressor units. As a result, engine hours are up . . . fuel consumption is down. It's on Page 38 . . .

General Motors M-16 1000-kw Mobile Diesel Power Cars—11 of 'em—took a long ocean voyage to bring light to electricity-starved Brazil. Drought had dried up rivers that normally supply Brazilian hydro-electric plants. Page 42 for this picture-caption story . . .

Chile is in the news these days —earthquakes shook our South American neighbor last month. Our story on Page 45, though, deals with construction rather than destruction. Allis-Chalmers HD-21's are hard at work on a giant hydroelectric plant site, working 'round-the-clock!

What happens when a water well driller switches to diesel power? He saves himself a wad of dough, that's what. Where he used to need up to 50-gallons of gasoline a day—now he uses only seven gallon of fuel in his Ford "330" diesel. It's on Page 46 . . .

A distinguished visitor paid us a call late last month. Who was he? What did he want? Well, you can find out by reading this month's Editorial on Page 13 . . .

ESTABLISHED IN 1923
JUNE, 1960 VOL. 38 NO. 6

diesel power

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BPA

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FOR YOUR COMPLETE DIESEL FILTRATION NEEDS

You get the right filter plus expert application engineering when you rely on CFC. Here's why:

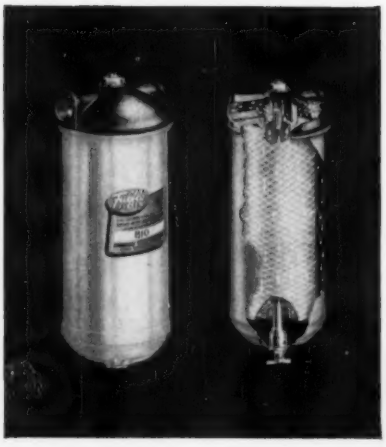
CFC Filters include a wide range of models for lube oil and fuel filtration.

There are many types for both depth and surface full-flow filtration; by-pass; and shunt systems.

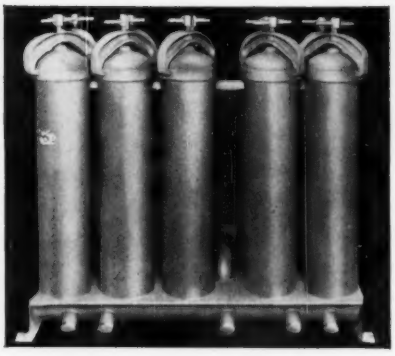
Experienced CFC Engineers will analyze your individual requirements and recommend the exact filter for your application.

Write Dep't DR

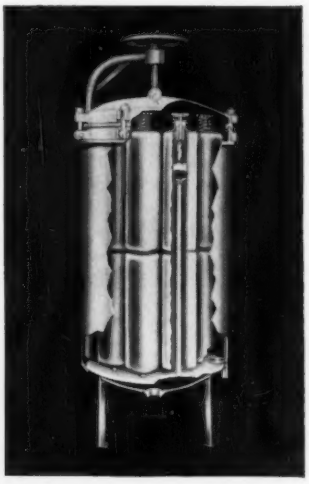
Filter out high costs with CFC Filters



CFC Fulflo Filter: Single-tube filter, with patented Honeycomb Filter Tubes, for true *depth* filtration. Multi-tube models also available.



CFC Michiana Filters: Variety of models available for 150 hp engines to 3,300 hp. Designed to fit limited space.



CFC Honan-Crane Multi-Cartridge Filter: Choice of seven types of filter cartridges includes inert media for removal of solid contaminants or Cranite (Fuller's Earth) for removal of solid particles and all products of oxidation.

CFC

COMMERCIAL FILTERS CORPORATION

Fulflo Honan-Crane Delpark Michiana

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THE finest

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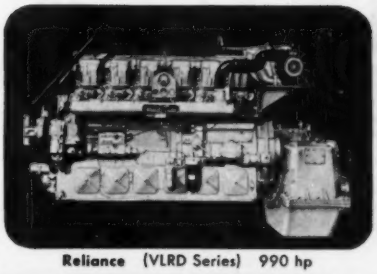
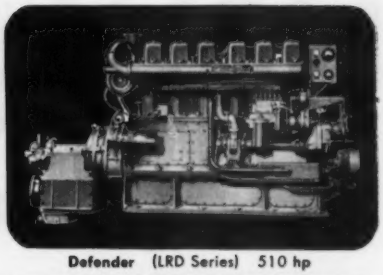
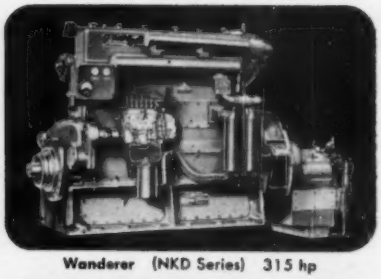


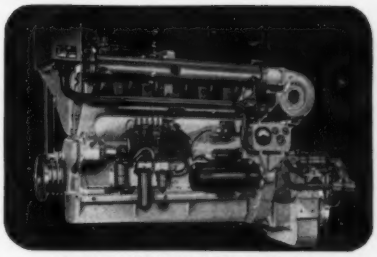
Reliance (VLRD Series) 990 hp



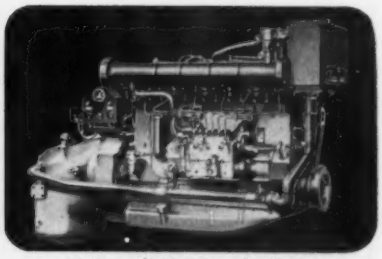
Defender (LRD Series) 510 hp



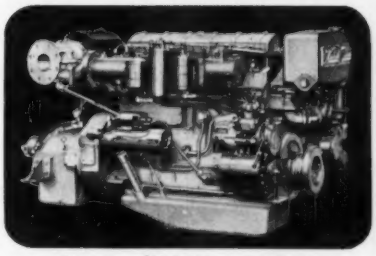
Wanderer (NKD Series) 315 hp



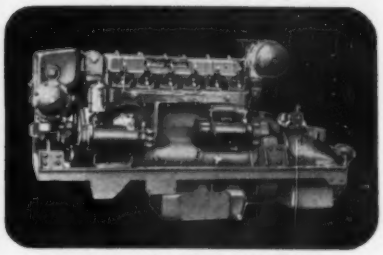
Resolute (WAKD Series) 290 hp



Vigilant (148-D Series) 195 hp



Cutwater (135-D Series) 120 hp



Navigator (197-D Series) 85 hp

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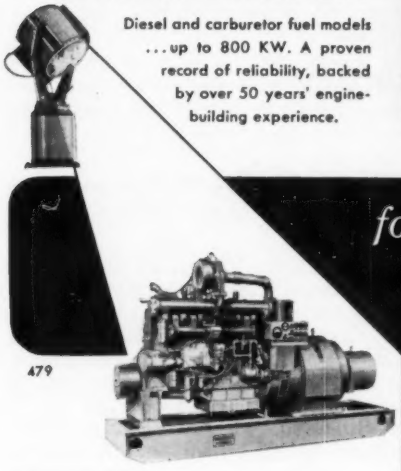
Diesel and carburetor fuel models ...up to 800 KW. A proven record of reliability, backed by over 50 years' engine-building experience.



479

for fishing vessels . . . tugs . . . towboats and work craft of all types

Engine	Type	Cyls.	Bore & Str.	Displ.	24-Hr. Max Rating
RELIANCE	Normal	12	8½ x 8½	5788	725 hp @ 1215 rpm
	Turbo	12	8½ x 8½	5788	990 hp @ 1215 rpm
DEFENDER	Normal	6	8½ x 8½	2894	335 hp @ 1215 rpm
	Turbo	6	8½ x 8½	2894	510 hp @ 1215 rpm
WANDERER	Normal	6	7 x 8¼	1905	240 hp @ 1215 rpm
	Turbo	6	7 x 8¼	1905	315 hp @ 1215 rpm
RESOLUTE	Normal	6	6¼ x 6½	1197	195 hp @ 1600 rpm
	Turbo	6	6¼ x 6½	1197	290 hp @ 1600 rpm
VIGILANT	Normal	6	5¼ x 6	779	150 hp @ 1800 rpm
	Turbo	6	5¼ x 6	779	195 hp @ 1800 rpm
CUTWATER	Normal	6	4¼ x 5	426	100 hp @ 2000 rpm
	Turbo	6	4¼ x 5	426	120 hp @ 2000 rpm
NAVIGATOR	Normal	6	4 x 4	302	65 hp @ 2000 rpm
	Turbo	6	4 x 4	302	85 hp @ 2000 rpm

WRITE FOR DESCRIPTIVE LITERATURE

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WAUKESHA, WISCONSIN

New York • Tulsa • Los Angeles

Factories: Waukesha, Wisconsin, and Clinton, Iowa

NOW Ni-Resist ductile irons offer you new combinations of useful engineering properties

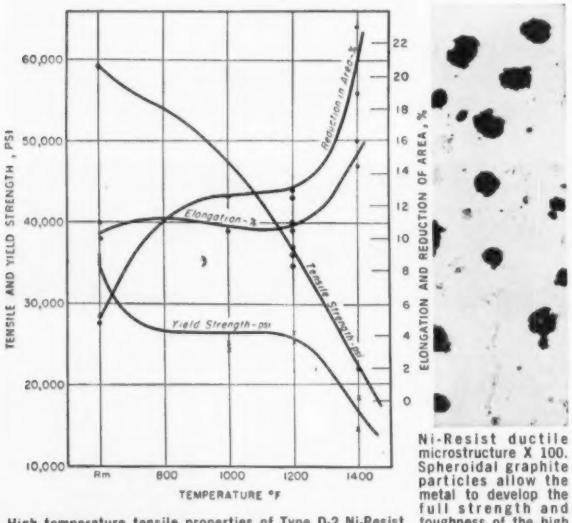
Ni-Resist* ductile irons are a new family of versatile high-alloy cast irons developed by Inco. Containing 18 to 36% Nickel, they provide the same high order of corrosion and heat resistance given by Ni-Resist flake graphite iron...plus high levels of strength and ductility.

There are several types of Ni-Resist ductile iron. Each one combines a useful array of engineering properties.

Strength Ni-Resist ductile irons provide tensile strengths of 55,000 to 80,000 psi, yield strengths of 30,000 to 44,000 psi. See graph of properties below.

Toughness Ni-Resist ductile irons give elongations of 4 to 40%, together with good impact resistance. The photomicrograph below shows why – spheroidal graphite particles are dispersed in an austenitic matrix. This nickel alloy matrix develops full ductility and strength . . . keeps these properties at low temperatures.

Corrosion resistance Ni-Resist ductile irons safely handle hundreds of corrosives. Under most conditions – with acids, alkalies and salts – their performance is far superior to both cast iron and steel, helping you reduce maintenance costs.



High temperature tensile properties of Type D-2 Ni-Resist ductile iron.

Ni-Resist ductile microstructure X 100. Spheroidal graphite particles allow the metal to develop the full strength and toughness of the high alloy austenitic matrix.

High temperature properties Ni-Resist ductile irons form a tightly adhering scale at elevated temperatures, greatly reducing further oxidation. They resist heat effects up to 1400° F and higher, have excellent thermal shock resistance. From 1100° to 1300° F, Type D-2 has stress rupture properties equal to those of cast HF stainless steel.

Wear resistance Ni-Resist ductile irons have a work hardening austenitic matrix. Graphite particles provide dry lubrication. Both properties work together to resist wear and galling over a wide temperature range.

Erosion resistance Ni-Resist ductile irons work well in wet steam, brine or salt slurries, and high velocity liquids. Their high strength and resistance to cavitation-erosion mean long service life for pump parts.

Controlled expansion Ni-Resist ductile irons have thermal expansivities from about 2.5 up to 10.4 millionths per degree F. You can match them with steels, cast irons, Nickel, Monel* alloy...with aluminum, copper, bronze and stainless steel.

Non-Magnetic properties Ni-Resist ductile irons, Types D-2 and D-2C, are non-magnetic and therefore useful where excessive heat and power losses must be avoided.

Machinability Ni-Resist ductile irons machine as well as common pressure-type gray iron, thanks to the presence of graphite in their structure.

Fluidity in casting Ni-Resist ductile irons have good flowing qualities and permit the making of intricate designs.

These are only the highlights. You can get *all* the facts on this versatile new family of metals by asking us for "Engineering Properties of Ni-Resist Ductile Irons." This 28-page booklet details engineering properties and commercial applications with numerous photos, tables, and graphs . . . gives you the information you need to decide how Ni-Resist ductile irons can help you. You'll also get "Buyers' Guide for Ni-Resist and Ni-Resist Ductile Iron Castings", listing foundries authorized to produce them.

*Registered trademark

THE INTERNATIONAL NICKEL COMPANY, INC.

67 Wall Street INCO New York 5, N.Y.

NI-RESIST DUCTILE IRONS

NICKEL ALLOYED IRONS PERFORM BETTER LONGER

The new LARC-5

has everything designed for lightweight ruggedness *including planetary axle ends by Clark*

The Army's new amphibious lighter, the LARC-5, with welded aluminum hull and water-tight cargo deck, is designed to give better performance both in water and on land. It's essentially a marine craft, but has four low-pressure tires which give exceptional on-land mobility. The Larc's designers, the Ingersoll Kalamazoo Division of Borg-Warner Corporation, chose Clark Planetary Axle Ends for this vehicle.

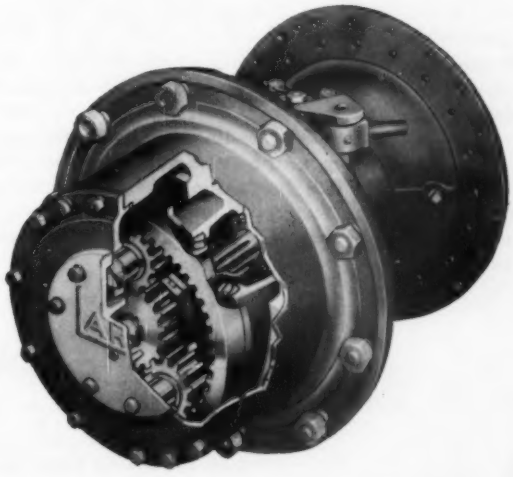
By putting the final power reduction in these Axle Ends, 70% of the torque load is taken off the axle shafts and other parts of the power train, allowing light weight yet reliable component design.

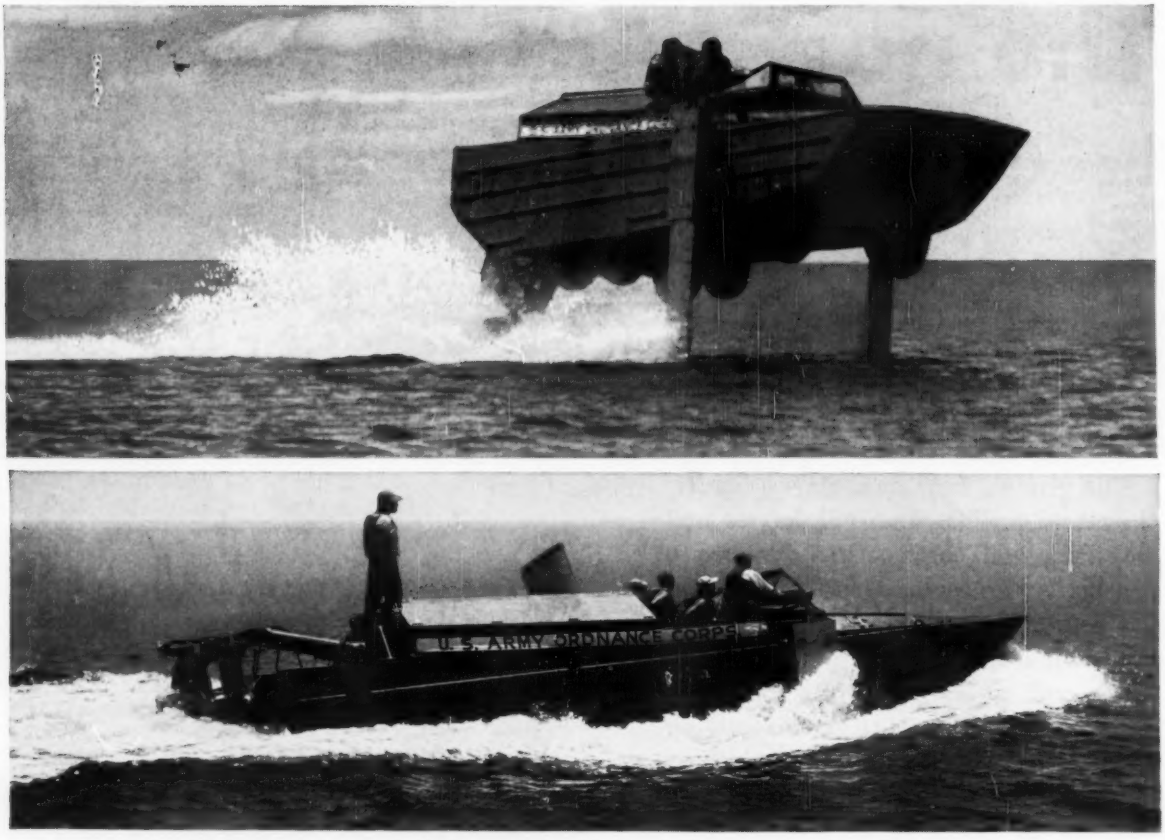
This is another example of how Clark's design experience and broad standard line of axles and axle ends—the broadest in the industry—can serve the needs of trucks, tractor shovels, and other heavy duty vehicles. Clark Planetary Axles, for example, are available in capacities ranging from 6,500 lbs to 120,000 lbs. For further information, address a card or a call to:

CLARK® EQUIPMENT

CLARK EQUIPMENT COMPANY
AUTOMOTIVE DIVISION
Buchanan 11, Michigan

With Clark planetaries, final reduction is accomplished in hub, by sun gear splined to axle shaft. Ring gear is fixed; wheel is driven by three revolving planet gears.





Shown in full "flight" above the water (top picture) and cruising (lower picture) is the Army's "Flying Duck." Hydrofoil craft have potential application on short passenger and freight runs—also offer military possibilities in anti-submarine patrol, air-sea rescue, and as a mobile missile launching platform.

BENDIX JET IGNITION "FIRES" UNIQUE LAND-SEA VEHICLE

A new and interesting vehicle using Bendix® jet ignition equipment is the "Flying Duck," developed by the Lycoming Division of the AVCO Corporation for the Army Ordnance Department. This unique gas-turbine-driven hydrofoil craft travels over land like a truck, cruises on the water like a boat, and "flies" above the water on its hydrofoil wings, which are extended below the surface.

Scintilla Division is a leading developer and supplier of ignition systems for the aviation, marine and general industrial fields. Bendix ignition systems are practically standard for piston aircraft engines, and our starting ignition systems are used on the latest jet and turbo-prop types.

In fuel injection, too, Bendix is a leading name—supplying standard and special systems for diesel engines in boats, trucks, trains and power plants. Both Bendix fuel injection and gas-turbine ignition systems were chosen for the auxiliary diesel engine and the gas-turbine power plant for the world's most powerful locomotive, built by General Electric for Union Pacific.

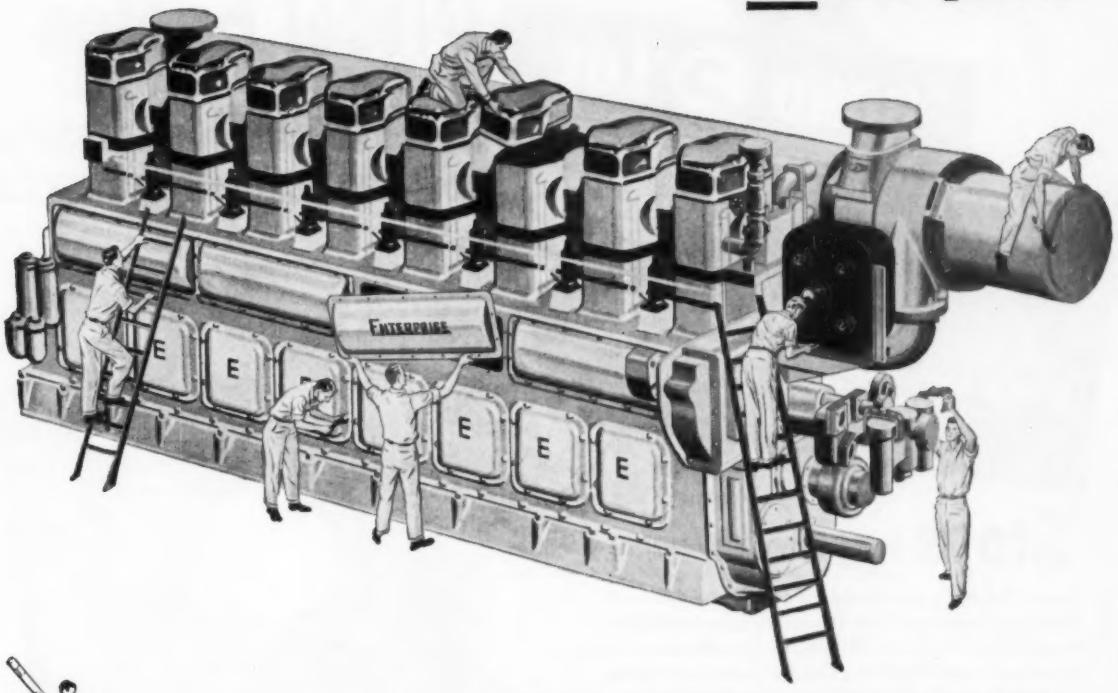
If you have applications for ignition or diesel fuel injection systems, we can help you cut costs and increase efficiency. Whether your needs are for new design, or for proved, day-in-and-day-out performance, Bendix experience can provide the answers. For information, write Scintilla Division, The Bendix Corporation, Sidney, New York.

Scintilla Division
Sidney, New York

THE Bendix CORPORATION

Export Sales & Service: Bendix International Division, 205 E. 42nd St., New York 17, N. Y.

It's easy to get to all the parts



Check these points
on "Easy-Access" ENTERPRISE Design
All major moving parts are enclosed with removable covers:
Main and connecting rod bearings are fully accessible through large door plates on both sides.
Cams, followers, camshafts and bearings are easily reached and removed.
Cylinder head and rocker arm assemblies, push rods and fuel nozzles are easy to reach by removing oil and dust-proof covers.
Gears are accessible through easily removable inspection covers.
No bulky shrouds or surplus covers to remove before getting to engine.
Parts, accessories and controls requiring occasional inspection or servicing are externally mounted.

You'll find that ENTERPRISE accessibility saves time, money and manpower in maintenance and overhaul

Ever watch precious hours slip by trying to find a way to dismantle, inspect or replace an engine part or assembly? Such unnecessary and costly down-time is something you don't have to worry about with modern, "easy-access" ENTERPRISE Diesels. For ENTERPRISE service-wise engineers have designed every model in the entire 73 to 2284 HP line for maximum accessibility and easy, low-cost servicing. That's why we say – and mean – you'll have less down-time if it's powered by an ENTERPRISE Dependable Diesel!

ENTERPRISE *Diesels*

THE DEPENDABLE

Enterprise Engine & Machinery Co., Subsidiary of General Metals Corporation
18th & Florida Streets, San Francisco 10, Calif. • National and worldwide sales and service.

#1 Piston choice of Diesel Engine Builders KEEPS ENGINES POWERFUL LONGER–AT LOWER COST

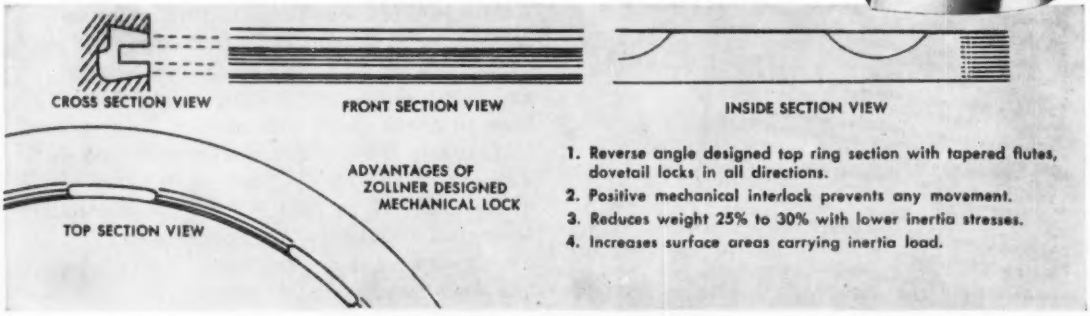
BOND LOC

Exclusively DOUBLE BONDED
"Ni-Resist" IRON TOP RING SECTION
METALLURGICALLY A1-Fin Process
MECHANICALLY Zollner Lock

Design adaptable to any type pistons

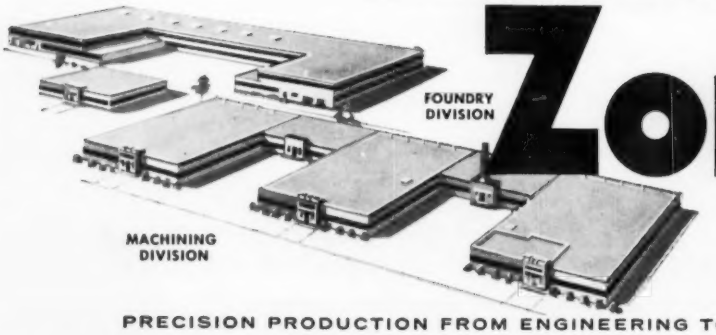
Stops Ring Groove Wear

Everywhere, engine builders and transport operators enthuse over the performance of Zollner Bond-O-Loc Pistons — "The greatest mileage piston we have ever used. Top ring groove wear problems are eliminated by the 'Ni-Resist' Iron section **permanently** incorporated with the double bond of both A1-Fin metallurgic **and the exclusive** Zollner mechanical lock." For longer piston life, better performance and lower maintenance cost, we suggest your immediate test of Bond-O-Loc advantages.



1. Reverse angle designed top ring section with tapered flutes, dovetail locks in all directions.
2. Positive mechanical interlock prevents any movement.
3. Reduces weight 25% to 30% with lower inertia stresses.
4. Increases surface areas carrying inertia load.

ZOLLNER CORPORATION • FORT WAYNE, INDIANA



ZOLLNER
HEAVY DUTY PISTONS

PRECISION PRODUCTION FROM ENGINEERING TO FOUNDRY TO FINISHED PISTONS

diesel power

editorially speaking

The Legend of (not so) Sleepy Hollow . . .

Last week a very old, old Gentleman ambled up to our desk. And before we could offer him a chair, he pulled up one for himself and sank wearily down. "I've been kinda out of touch with things, you might say," he told us with a decidedly German accent. He was wearing an old beat up hat and a rumpled shirt and suit that seemed right out of Victorian Days—say 50 or 60 or even 70 years ago. "Been wondering about *my* engine—the diesel?" he said, staring us straight in the eye. "Been wondering how it's doing for itself? Had a few things to do with developing it . . . but I-I haven't been around lately, been out of touch." We stole a glance at the mountain of unfinished work piled on our desk. Most of our June issue lay there in various stages of incompletion. "Well," we told our visitor, "that engine of yours has come a long way for itself! Trains, buses, taxis, tractors and trucks—they're all getting into diesel." The old fellow settled comfortably back into the chair and really beamed. "For instance," we continued, "take our June issue." With a sweep of our hand we indicated unfinished layouts. "We've got stories here on diesels drilling oil wells and water wells . . . powering cars and at least three different kinds of trucks." The old man sat up, visibly impressed. Pleased as punch, he began rubbing his old hands together. ". . . and," we continued, "there's a true diesel-to-the rescue story, bringing electricity to Brazil. Plus, Sir, your diesel is even keeping frozen foods frozen today!" Our visitor coughed, interrupting us. "My first job was in a refrigeration plant," he said, smiling reminiscently. We talked for a few minutes more—then our visitor stood up, nodding abruptly in the old European fashion. He fumbled around in his pocket for a moment, handed us a card . . . and then completely vanished, leaving us standing there staring at this slightly wet business card. It smelled faintly of the sea and printed in small gothic letters was this name: *Rudolph Diesel, mechanical engineer.*

B. M.

Yesterday at 3:03
MacLeod & Co.

Went out of business

(it could happen to you... TODAY!)

At 3:03 p.m. yesterday this clock stopped.

So did plant elevators . . . one of them mid-floors, with Mac Leod in it. Lights went out . . . computers, tabulators and typewriters "died" . . . critical plant equipment stood useless. Pumps handling continuous-flow processing coughed to a halt . . . and in the laboratories, a crucial experiment requiring weeks of costly preparation was hopelessly sabotaged.

Without the "safety valve" of *adequate* power-generating standby diesel units, thousands of dollars worth of water-cooled processing equipment was quickly "cooked" to scrap iron by the crippling paralysis of power failure.

Seconds before, a catastrophe could have been avoided . . . if a Fairbanks-Morse Opposed-Piston diesel had been on hand, ready to pay for itself within the first few fleeting minutes!

When did you last review your standby power facilities? Yesterday? Eighteen months ago?

When emergency threatens . . . be it electrical storms, high winds, floods, drouth, heavy snows or equipment breakdown . . . you want *adequate* standby power equipment. And you want *the best.*

That, of course, means Fairbanks-Morse, pioneers of diesel building in America. No other manufacturer produces so great a variety of diesel engines for *all* services and purposes, from one-cylinder and five hp to 12-cylinders, 4200 hp . . . and *matching* generators, alternators and generator sets.

Get the facts why F-M two-cycle, Opposed-Piston diesel power . . . turbo-charged or otherwise . . . is unsurpassed for compactness, dependability and fuel savings. Drop a line today to: Fairbanks, Morse & Co., Diesel Division, Beloit, Wisconsin.

Fairbanks, Morse

DIESEL DIVISION

A MAJOR INDUSTRIAL COMPONENT OF **FAIRBANKS WHITNEY CORPORATION**

diesel power news section highlights

SWEDEN'S DIESELIZED TRUCKS ON INCREASE

Of newly registered trucks today in Sweden, 35 per cent are diesel-powered . . . with Austin, Bedfords, Fords, Mercedes, Scania-Vabis and Volvo leading the list. Buses? 76 per cent of buses Swedes ride are diesel-powered . . . and that percentage is increasing!

NATIONAL BUREAU OF STANDARDS SPEEDS YOUR OIL ANALYSIS

Metal-organic samples—24 different metals commonly found in used-oil samples—are now available from National Bureau of Standards. If you're using spectrographic-chemical analysis to determine metal-level in crankcase oils, these standard samples can be used as comparison controls. Accurate control samples are something that's been needed for engine oil analysis for a long, long time.

RIO GRANDE RAILROAD TRIES "BURNING ROCKS" IN THEIR DIESELS . . .

Rio Grande Railroad's year-long experiment with low-cost, economical Gilsonite ore fuel is having some success. Gilsonite fuel, promising to be cheaper than petroleum, is a solid hydrocarbon ore found at or just beneath the surface in Utah and Colorado. American Gilsonite, affiliate Standard Oil Company of California, is expanding their production to 1300-barrels for railroad use.

. . . RAILROAD'S SEARCH FOR LOWER-COST FTU'S CONTINUES

Southern Pacific's been conducting propane fuel tests with their EMD diesel locomotives. Looks like liquid petroleum gases—at half the price of diesel fuel in Texas and Louisiana—is becoming a real possibility. SP's approach to a solution (worked out for them by Southwest Research Institute) is to use a dual-fuel system—liquid propane is injected and ignited by a diesel fuel pilot charge. Special pistons lowered compression ratio from 16:1 to 15:1. Result is smooth combustion at 90 per cent of rated bmep, 800-rpm. Research is continuing. . . .

GE WILL MARKET DIESEL-ELECTRIC LOCOMOTIVE HERE

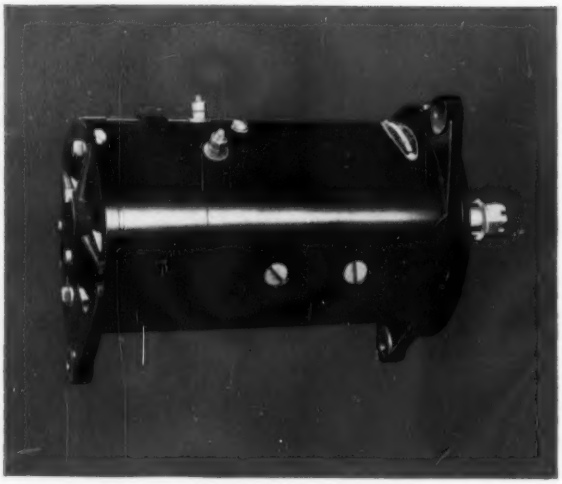
General Electric has just announced plans to enter the domestic diesel-electric locomotive market. GE's Ralph J. Cordiner says it'll be a Cooper-Bessemer 2500-hp engine on 4-axles offering more power per axle (625-hp) than any comparable locomotive. GE's been in locomotive component parts business for nearly 70-years, as well as exporting diesel-electrics. However, this marks their first appearance on US scene with a diesel-electric locomotive.

TREND ON STANDBY DIESELS IS UPWARD

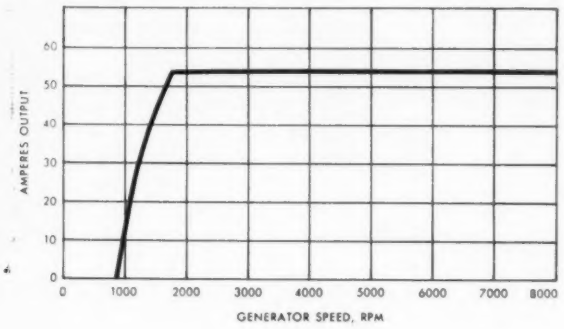
Trend is important enough that front page story in the WALL STREET JOURNAL surveyed standby generator sales. Increasing tendency to insure against power failure losses has given diesels big boost in this market. Cummins estimates their standby sales are up 20 per cent in 1959 over previous year. For International-Harvester the figure is neighborhood of 25 per cent. Detroit Diesel also reports steady upswing . . . and New York City's Griffin Equipment Corporation has had a 100 per cent increase in standby sales since '57! Recent power failures in New York City pointed up need for this kind of protection. Sales there have ranged from those to hospitals and manufacturers . . . to an underground art gallery vault.

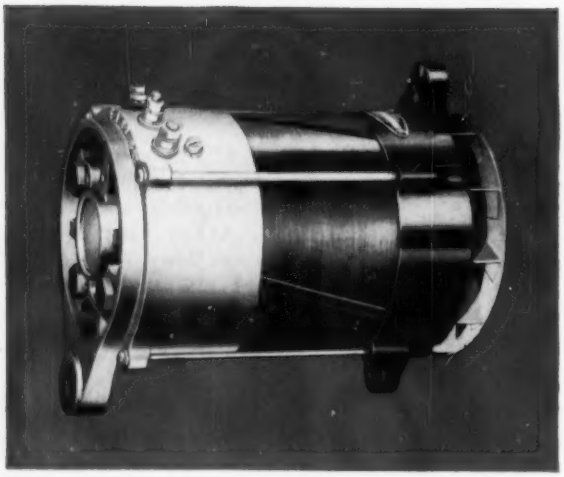
MORE INDUSTRY NEWS FOLLOWS ►

TAILOR YOUR TRUCKS

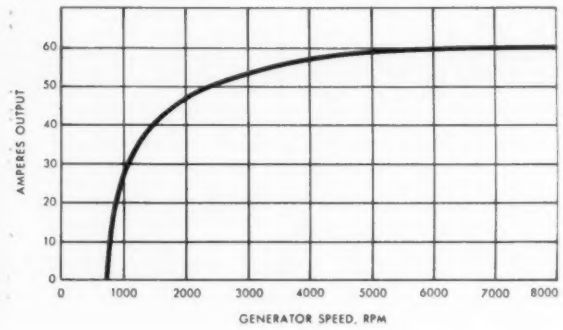


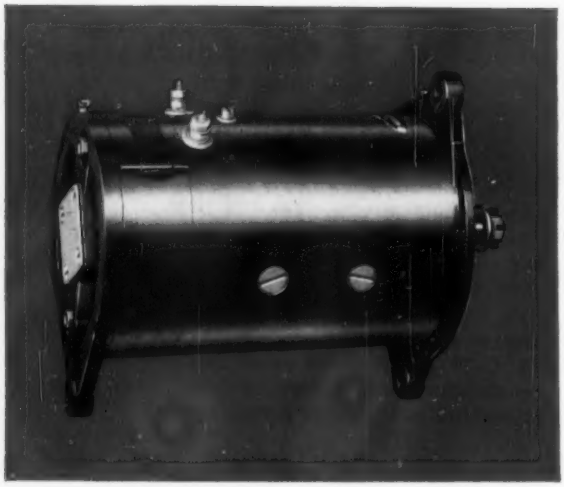
1106991 EXTRA-OUTPUT D.C. GENERATOR—12 volts • 55 amperes • 12 amperes at idle—For cross-country trucks, school buses and other vehicles with extra electrical equipment.



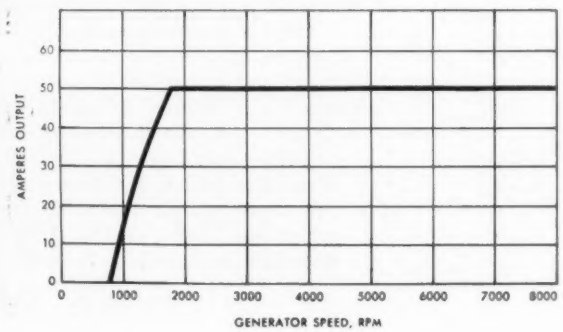


1117070 SELF-RECTIFYING A.C. GENERATOR—12 volts • 60 amperes • 27 amperes at idle—For high-duty vehicles with heavy electrical loads . . . operating at all speed ranges. Ideal for excessive low-speed operation and curb-idling.

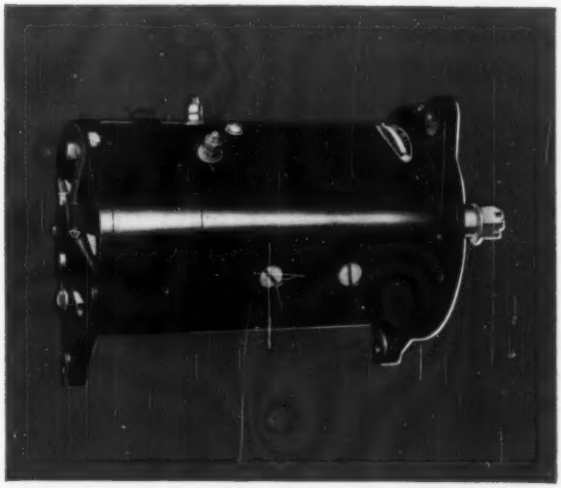




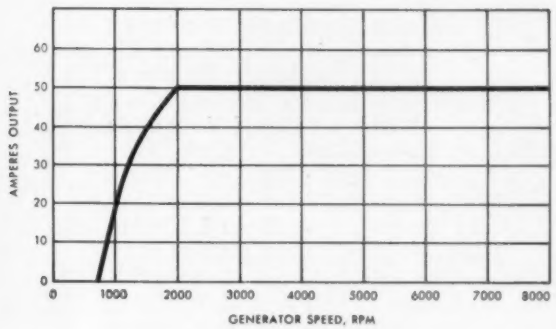
1106985 EXTRA-OUTPUT D.C. GENERATOR—12 volts • 50 amperes • 14 amperes at idle—Short frame generator for difficult mounting applications. For vehicles in city and suburban use. Not for cross-country operation.

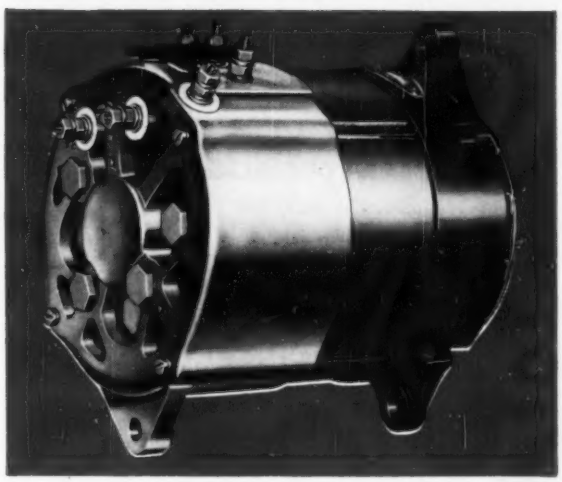


TO JOB CONDITIONS

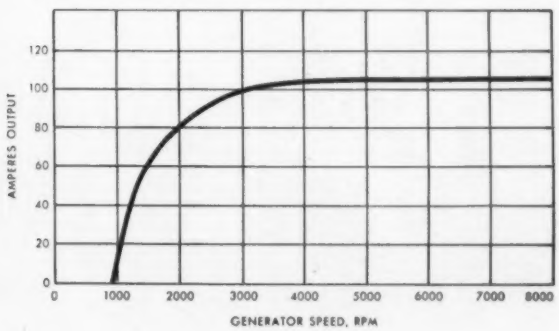


1106986 EXTRA-OUTPUT D.C. GENERATOR—12 volts • 50 amperes • 20 amperes at idle—For metropolitan trucks and school buses, with extra electrical equipment . . . operating at low speeds and with engine idling most of the time.





1117115 SELF-RECTIFYING A.C. GENERATOR—12 volts • 105 amperes • 10 amperes at idle—For high-duty vehicles with extra-heavy electrical loads . . . operating at all speeds. A.C. voltage available for 110 V conversion.



Delco-Remy offers a complete line of D.C. and A.C.-D.C. generators that are right for the job.

Demands on the electrical systems of trucks vary with their use. For best performance, whether the vehicles be new or already in service, the electrical equipment should be job-matched to meet those demands.

Do your trucks have extra electrical equipment? Operate cross-country, around town or off the road? Do they travel at sustained highway speeds, or with plenty of stop and go? Whatever their assignment, there are Delco-Remy extra-output generators and regulators job-matched to meet the electric power needs *exactly*.

Delco-Remy ELECTRICAL SYSTEMS

GM GENERAL MOTORS

FROM THE HIGHWAY TO THE STARS
DIVISION OF GENERAL MOTORS • ANDERSON, INDIANA

diesel power news section

Silver Shovel Broke Ground

at Allis-Chalmer's new multi-million dollar diesel engine plant going up in Harvey, Illinois. Left to right: A. W. Van Hercke, VP, Director of Engineering, Tractor Group: William B. Kane, Mayor of Harvey, Ill.; L. C. Daniels, General Manager, A-C's Engine-Material Handling Division; John Ernst, General Works Manager, VP, Tractor Group; Owen J. Higgins, General Manager, Harvey Works; E. J. Mercer, VP, General Manager, Construction Machinery Division; J. C. Baseheart, Engine Sales Manager, Engine-Material Handling Division.

Shipment Of GM Locomotives

to Brazil is underway. It's part of a 92 locomotive order. Federal Railway Network of Brazil gets them—they join 199 others already there. Brazil is top user of GM's locomotives outside US and Canada.

Headed Down Venezuela Way,

these three giants will soon be hauling iron ore. Rear-end dump 40-ton Macks, they're part of a 7-truck shipment bound for U. S. Steel's Orinoco iron mine in South America. They'll be joining a fleet of 30 off-highway trucks—all of 'em Macks.

NEWS SECTION . . .

New Diesel Fuel From Standard of Indiana

Fuel that's tailor-made for diesel engines and claimed to improve performance and reduce your maintenance problems is now being introduced by Standard Oil Company (Indiana).

Dwight F. Benton, sales vice president for Standard, says their new Premier diesel fuel was especially designed for the newer more exacting compact 2 and 4-cycle high-speed diesel engines. "Our research department," says Benton, "determined what kind of specifications a diesel fuel *should meet*—the result is, Premier diesel fuel."

Standard's new fuel is claimed to cut injector wear . . . to burn better . . . reduce repairs and give you maximum power and mileage with minimum engine deposits, smoke and odor.

"Diesel truckers will benefit," Benton indicated, "because fuel quality will be uniform wherever they fill up."

Eskimos End Diesel Course —Northern Lights Begin!

Igloos will be a lot brighter up in the Canadian Arctic. Seventeen Eskimos recently graduated from a 4-month diesel electrical powerplant operators course at the Royal Canadian Electrical and Mechanical Engineering School. This was the first time the school had enrolled Eskimos from the Arctic. Majority of the group are school caretakers who will use their training to take over operation of school lighting and power plants. Others will qualify as full-time diesel electric power plant operators at Arctic defense centers.

Canadian Sales Soar For GM Diesel

Canadian sales of G.M. Diesel engines during 1959 reached a new high. Final figures reveal that sales during 1959 reached the highest level of any year in peacetime history. G.M. Diesel engines shipped from the Detroit plant during the year represented a total increase of 2,000,000 horsepower over 1958.

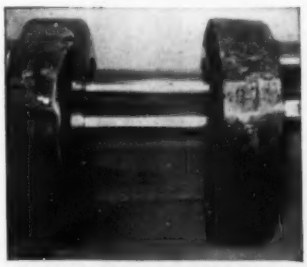
(Continued on page 20)

THIS CRANKSHAFT JOB NEEDS A SPECIALIST

This is specialized work, rebuilding crankshafts—intricate, exacting, and naturally expensive. It's the kind of work that demands a specialist . . . and we are just that!

We've specialized in rebuilding crankshafts, because since 1916 we've *made* crankshafts. And who knows better than a maker what are the "musts" of a sound, economical repair job. We'll take your worn crankshaft and rebuild it, if salvagable, through the carefully controlled steps of grit blasting, replating, regrinding and thorough inspection. And we'll deliver it back with a guarantee for 100% performance that only a manufacturer-specialist can provide. May we quote on your next job?

For more details on crankshaft repair write for Bulletin RC-3



This is a finished, repaired crankshaft, after processing by National Forge.

NATIONAL FORGE COMPANY
IRVINE, WARREN COUNTY, PA.

(Continued from page 19)

$2-Million BARC Contract

$2-million contract for construction of six giant amphibious self-propelled Army Transportation Corps lighters has been awarded to the Transval Electronics Corp. BARC's—world's largest amphibian, measuring 62½-ft long, 26½-ft wide, 19-ft high—are used to bring supplies from a ship off-shore to transfer points a short distance inland. Weighing 100 tons, they normally carry a 60-ton payload but in an emergency can carry their own weight in cargo. Each of the 9-ft wheels on which they roll is propelled by a 200-hp diesel engine driving through torque converters. On water, drive is by two marine propellers, with two of the engines turning each propeller shaft, for a speed of 7½-mph. Land speed is 14-mph with normal load.

The World's Largest Manufacturers of
FUEL INJECTION EQUIPMENT
for Diesel Engines
Depots and Service Agents
in over 100 Countries
C.A.V.
FUEL INJECTION EQUIPMENT DIVISION
of
LUCAS ELECTRICAL SERVICES, INC.
Head Office: 501 West 42nd Street, New York 36
Sales Office: 14820 Detroit Avenue, Cleveland 7, Ohio
West Coast: 5025-29 W. Jefferson Blvd., Los Angeles 16, California
Branch Offices:
171 Beacon Street, South San Francisco, San Francisco, California
5001 West Belmont Avenue, Chicago 41, Illinois
400 South Edgewood Avenue, Jacksonville, Florida
Canadian Distributor: Joseph Lucas (Canada) Ltd.
Head Office: 11 Davies Avenue, Toronto 8, Ontario
Branch Office: 3401 St. Antoine Street, Montreal 30, Quebec
AP 935

Push Button Age Coming —Even For Earthmovers!

"Push button ease" for operators of construction, farm and industrial equipment was predicted at the Annual SAE Earthmoving Industry Conference in Peoria, Illinois. Joseph T. Osterman of The Electric Autolite Company pointed out that the electronic systems and controls which would make the operator a button pusher are rapidly becoming economic necessities for this type of equipment. These controls can automatically guard against abuse or overload of expensive equipment, speed up operation of the equipment and cut down on the operator training needed. Mr. Osterman said, "Electrical control systems that ten years ago would have been considered radical or ridiculous are being offered as optional equipment on 1960 models." Mr. Osterman described a number of components now available and making feasible remote control of transmissions, engines and emergency automatic systems.

"Cat" Insuring Their Rebuilt Assemblies

Guaranteed rebuilt parts assemblies are now available from Caterpillar dealers in the United States and Canada under a "Bonded Buy Parts Assembly" program. The bond, issued by Lumberman's Mutual Insurance Co., guarantees a rebuilt exchange assembly up to a $5000 cost. Only a few units in the assembly exchange program, such as complete diesel engines, would come to that price. This is the first time in the equipment industry that a manufacturer and its dealer organization have gone to this extent to assure customers of complete protection against defective workmanship or material in rebuilt assemblies. Under the assembly exchange program, customers "trade-in" defective or worn units for a rebuilt assembly. These items range from turbochargers to flywheel clutches to complete track-type tractor undercarriages. The customer is charged on the basis of parts and labor necessary to rebuild his trade-in to "good-as-new" condition. This

rebuilt assembly exchange program has proven an effective means of reducing overall machine repair costs by getting "down" equipment back into productive work in a short time.

"RPM DELCO" Lube Oil Designed For Diesels

Super "RPM DELCO" Special, a new lubricating oil developed especially to upgrade the performance of diesel engines, has been introduced by Standard Oil Company of California. Fortified with special detergent-action additives, corrosion and oxidation inhibitors and effective defoaming agent, this new oil has been thoroughly tested in the laboratory and under severe field conditions. Wide work range (difficult-to-servere service) makes it particularly effective for simplifying mixed fleet operations. It's especially designed to control the bad effects of high sulfur diesel fuel.

Roth Corp. Buys White-Roth Machine Corp.

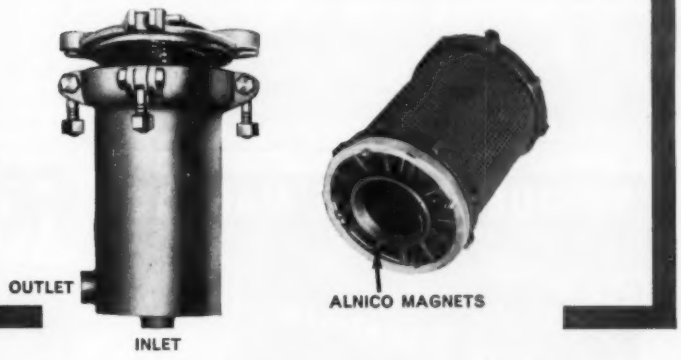
Roth Corporation has purchased all patents, drawings, inventory, tools and equipment from White-Roth Machine Corporation, Lorain, Ohio. The newly-formed Roth Corporation will specialize in design fabrication of special equipment and machinery, as well as contract machining. Roth will be manufacturing and selling products formerly produced by White-Roth. Roth Corporation plans continuing the entire product line of Lorain gas engines and compressors, widely used in the oil fields, and will stock spare parts.

Army Runs MultiFuel Tests

Army Transportation Corps reports superior performance for their versatile, multifueled truck diesel engine. It burns Army gasoline jet fuels, kerosene or marine diesel fuel and recently was put in competition with a standard gasoline engine.

Transportation Corps used two "M-48" standard two-and-a-half ton Army tractors in the diesel vs. gasoline tests. One truck employed conventional gasoline power; the competing M-48 was identical except for replacement of the gasoline engine by Continental Motors Corporation's LDS-427 Hypercycle engine. Army gasoline, JP-4 fuel, kerosene, standard diesel and marine diesel fuels were successively burned by the diesel rig. The control M-48 burned only gasoline. Army indicates that, when utilizing any one of these five representative, common fuels, the new multifuel diesel plant demonstrated "a significantly lower fuel consumption rate than the standard gasoline engine." Operating on kerosene or either grade of diesel fuel, the contrast was even more pronounced. On these three less-refined products, the multifuel diesel "greatly outperforms the standard M-48 truck." Only on the more highly refined JP-4 fuel or gasoline under freezing conditions did the diesel encounter difficulty. The warm-up was speeded, however, by priming the air-intake-manifold heater. The Army indicated that minor thermostatic and priming adjustments might eliminate even the cold weather limitations satisfactorily.

GET THE *ADDED PROTECTION*
OF MAGNETIC SEPARATION WITH
THIS BASKET-TYPE STRAINER



Nugent now manufactures a line of basket-type strainers offering the added protection of magnetic separation. Specially designed Alnico magnets establish a magnetic field through which the strained liquid must pass as a final stage before leaving the unit. Thus, minute ferrous particles are trapped and removed from the fluid stream.

If you have valuable engines or other equipment which demands top-notch lubrication protection, it will pay you to get the full story on the Nugent combination strainer-magnetic separator.

Write today . . . no obligation, of course.

ESTABLISHED 1897
REPRESENTATIVES IN PRINCIPAL CITIES

WM. W. NUGENT & CO., INC.
3426 CLEVELAND STREET, SKOKIE, ILLINOIS
OIL FILTERS • STRAINERS • TELESCOPIC OILERS
OILING AND FILTERING SYSTEMS • OILING DEVICES
SIGHT FEED VALVES • FLOW INDICATORS

diesel power news section people plants

GM's Electric-Motive Division Appointments

Duane O. Brooks, Bruce C. Burdick, and **Melvin A. Hiter** have been named parts sales representatives in the Eastern Region, with **Allan A. Michels** appointed regional service manager replacing **W. A. Turner** who has retired. Mr. Brooks will operate out of Jacksonville, Florida while Mr. Burdick and Mr. Hiter will be located in New York. Also, **Henry M. Garvey** and **Ivan E. Rice** take over in Chicago and San Francisco regions respectively.

New Quality Manager at Chandler Evans

Carl F. Baker has been named quality manager at **Chandler Evans Corp.**, West Hartford, Conn., after serving in the same capacity and additionally for ten years as chief engineer of the Hamilton Standard division of United Aircraft Corp.

Burgess-Manning Appointments . . .

Industrial Silencer Division of **Burgess-Manning** has announced three promotions and new assignments involving personnel in Dallas, Los Angeles, New York City, and Libertyville, Ill.

- **Louis G. Halla** has been promoted from a sales engineer to manager of the company's western district sales offices in Los Angeles.
- **H. L. Harris** is the new manager, and **G. R. Packer,** former sales coordinator, is now a sales engineer in B-M's southern district sales office in Dallas.
- B-M also announced that **Albert J. Stella, Jr.,** joined the company as a sales engineer in the eastern district sales offices in New York City.
- The Libertyville district sales office will continue to be directed by **F. C. Duerr,** district manager, and **R. F. Anderson,** sales engineer.

Sterling Named Mack Omaha District Manager

E. C. Sterling has been named Omaha district manager for **Mack Trucks.** He succeeds **E. O. Kampmeier** who has been appointed district manager in St. Louis. Sterling started in the truck business as a Providence, R. I., truck dealer, bringing more than 14-years' of heavy duty truck experience with him when he joined Mack as Omaha wholesale manager in '59. In his new post he'll be responsible for sales, service and distributor management in western Iowa, eastern Nebraska and southeastern South Dakota.

Kampmeier, new St. Louis district manager, was Omaha district manager since May 1959 . . . before that he was Indianapolis district manager, a post he held for 6-years. He'll be responsible for sales, service and distributor management in southern Illinois, eastern Missouri and western Kentucky.

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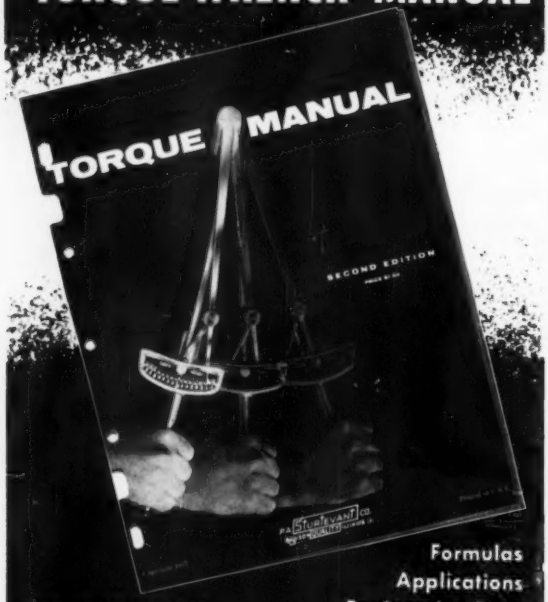

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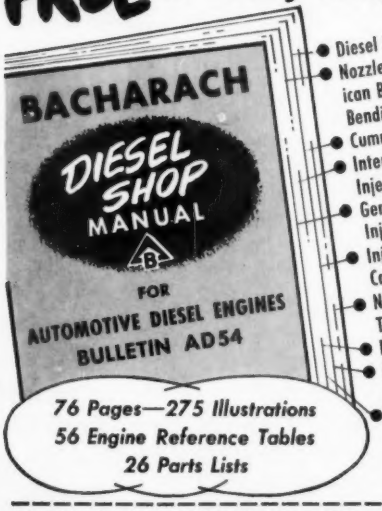

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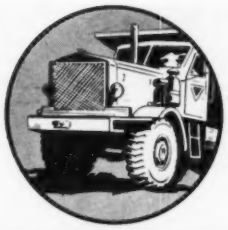

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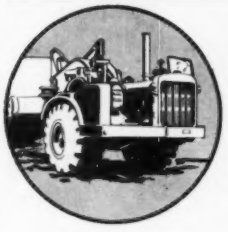

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Recent Cooper-Bessemer Appointments

• **Harold C. Johnson** has been named a vice president of **Cooper-Bessemer of Canada, Ltd.**, and will be in charge of that company's manufacturing operations. At the same time, **C. W. Gilchrist** has been appointed plant manager of the corporation's new manufacturing facilities of Stratford, Ontario, Canada.

Johnson was also named a vice president of the parent corporation. Until his new appointments, Johnson was manager of manufacturing for the parent company's main plants at Mount Vernon, Ohio, and Grove City, Pennsylvania. Gilchrist was formerly assistant works manager at the Mount Vernon plant.

• **Robert A. Woodward,** formerly assistant production manager for the Mount Vernon plant of Cooper-Bessemer, has been promoted to production manager of the new Stratford plant of Cooper-Bessemer of Canada, Ltd. Woodward came to Cooper-Bessemer in 1950 as a production engineer in the Mount Vernon plant. He was made assistant to the Mount Vernon factory superintendent in 1952 and assistant to the Mount Vernon production manager in 1955. In 1957 he was promoted to assistant production manager.

• **Stratford** represents Cooper-Bessemer's initial entry onto the Canadian manufacturing scene. C-B of Canada has leased a section of a large plant owned by Canadian National Railways. They hold options to buy the presently loaned area as well as additional areas. Other sections of the plant will be available to C-B as the market for Canadian manufactured products expands. It has been predicted that by 1980, production of natural gas and oil in Canada will be up as much as 790% over 1960. Plans call for the immediate use by Cooper-Bessemer of some 60,000 sq. ft. of the 200,000 sq. ft. facility. Employment at the plant may eventually reach 500.

• **James C. Dangler** has joined Cooper-Bessemer Corporation as a sales engineer. Dangler will work under the supervision of **Fletcher M. Devin,** Cooper-Bessemer vice president and district sales manager of the East-Central Sales District.

New Research Lab For Purolator

Purolator has opened the doors to their new research laboratories in Rahway, New Jersey. It's described as the country's most complete filtration research center. There's two chemistry labs, a mechanical lab, pilot plant manufacturing area, library and offices. 13,000-sq ft in all!

"With this expansion," **James D. Abeles**, president of Purolator, said, "we will be able to conduct not only new filter media research but also studies in how present media materials may be used in the diversified field of industrial and commercial products."

Condec Names Cesario G.S.M.

Frank M. Cesario has been named general sales manager of **Consolidated Diesel Electric Corporation's** Power Equipment Division. In his new position, Cesario, formerly assistant sales manager, will be responsible for all activities leading to the sale of the Condec line of engine-driven electrical generating equipment.

(Continued on page 56)

Today's Diesel Man...

Story and pictures by Paul B. Harder

Dieselman Zache keeps 21 huge haulers running 'round - the - clock. They cost $75,000 each!

We're rough as hell on equipment here . . . dust, mud and 7% grades. We dump 40-tons of rock in 30-ton trucks and drive them flat out three shifts a day."

Charlie Zache, diesel man for the Inspiration Consolidated Copper Co. in Miami, Arizona waved his hand toward the terraced open-pit copper mine yawning below us. The roar of diesel engines shattered the still mountain air.

"We have 21 haulage trucks—Euclids and Darts—and work 'round the clock. My job is to keep those buggies rolling—keep the muck coming out."

Diesels Bring Costs Down . . . Production up!

Inspiration Consolidated Copper Co. began operations back in 1915, using underground shafts and the block caving technique. Conversion to open-pit methods in 1947 was partly the result of increasing underground costs, partly the result of improved surface-type mining equipment.

Tom Anderson, open-pit boss states that, "Two things made the open-pit idea a practical possibility here. First of all, diesels engines had been developed that could power the trucks needed for our haulage operations . . . and tires had been developed that could stand up under the treatment we would have to give them."

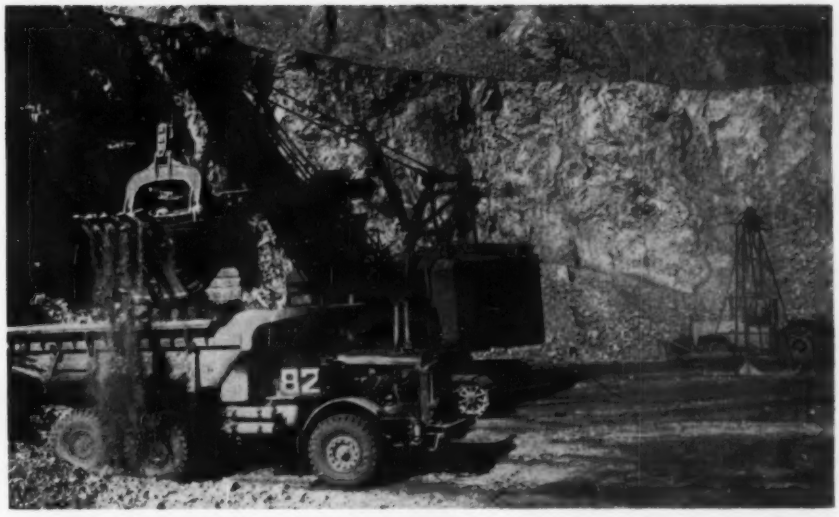
In order to operate profitably above ground, handling incredible amounts of ore in the process of obtaining surprisingly small amounts of copper (less than 1% by weight!), Inspiration's operational costs had to be measured and analyzed in fractions of pennies per ton of material handled. This intense concern over material handling costs was an important factor in the decision to purchase diesel equipment. Inspiration invested heavily in diesel trucks and in diesel tractors, in huge electric shovels and—most important—in the kind of people who could oversee the conversion from underground to open-pit mining. People such as diesel man Charlie Zache.

"When we went to open pit mining 13 years ago we knew we were going to depend heavily on modern earthmoving and haulage equipment . . . knew we would need a man who could take charge of the repair and maintenance of this equipment. Charlie has more than fulfilled our expectations. He has grown with the job to become what we consider an expert in his line of work."

H. C. Weed, vice president and general Manager, Inspiration Consolidated Copper Co.

"Our first haulage trucks were model 250 Darts—about 22-ton capacity," recalls Charlie. "Since then they've been repowered with Cummins engines and twin Disc torque converters . . . and are now hauling 28-tons."

Today Charlie Zache is responsible for 21 diesel haulage trucks: nine are 4FFD Euclids, two are 10FFD Euclids, four are 35SL-KW Darts and six are the early



Euclid gets its 40-ton load. Hauls up 7% grades . . . working 3-shifts with time out only for fuel and service!

model 300 Darts. Backing up these trucks are nearly two dozen other pieces of major excavation equipment. Equipment ranging from Caterpillar D-8 tractors to a 4-cyl diesel engine on a crusher.

It goes without saying that Inspirations open-pit experiment proved successful. Costs of "getting the muck out" have dropped as equipment has improved and production has risen. Now, two tremendous pits, each measuring over a half-mile in diameter and 600-ft. to 800-ft. deep, provide Inspiration's giant leaching plant and smelter an almost endless supply of ore for the production of high-grade copper.

Good Maintenance is Key to Their Operation . . . and Zache holds the key!

Understandably, diesel man Charlie Zache's greatest operational and maintenance problems center around the 21 haulage trucks. With the possible exception of the electric-driven shovels, no equipment is more indispensable to Inspiration's continued economic existence.

Zache's responsibility is to keep 'em running.

"Our engines, even with the best possible maintenance, seldom last more than 8000 to 9000-hours." Charlie ran his fingers down a carefully kept sheet showing all Inspiration's equipment and its history of repairs and servicing. "We think this is good, considering how hard we load—even overload them. Earlier engines gave us only 2000 or 3000-hours. Today we work our equipment harder . . . and it lasts longer. The difference has been better engines and a good careful maintenance operation."

With the mine working 24-hours a day, six and seven days a week, proper service presents a challenge to Charlie Zache. But at $50,000 to $75,000 apiece, Inspiration cannot afford to have many trucks on a down time basis.

Lunchtime is Lubetime . . .

To get maximum availability, Charlie has combined typical over-the-road maintenance operations with those found in use on heavy construction projects. Part of the servicing is done every meal break by special fuel and lube trucks that travel the pit areas. Once every three shifts, Charlie manages to get each truck into his main garage for complete lubrication and filter changes as well as routine checkup.

"Field fueling and lubrication are indispensable," notes Charlie. "These trucks average nine to ten miles per hour . . . consume about a gallon of diesel fuel per minute. You can see why we fuel every four hours or so."

Despite a well-equipped garage and shop, Charlie does not attempt to handle engine rebuilding as a regular diet. His feeling on this: engine specialists are better equipped to do the precision job required for his engines.

(Continued on page 37)

Detroit Diesel's 380-hp, 12V-71 supplies power for C-J's "Double-Bottom" combination.

Toll Roads Call For Truck Customizing

Here's how one trucker's tractors were built to meet new Double-Bottom hauling requirements . . .

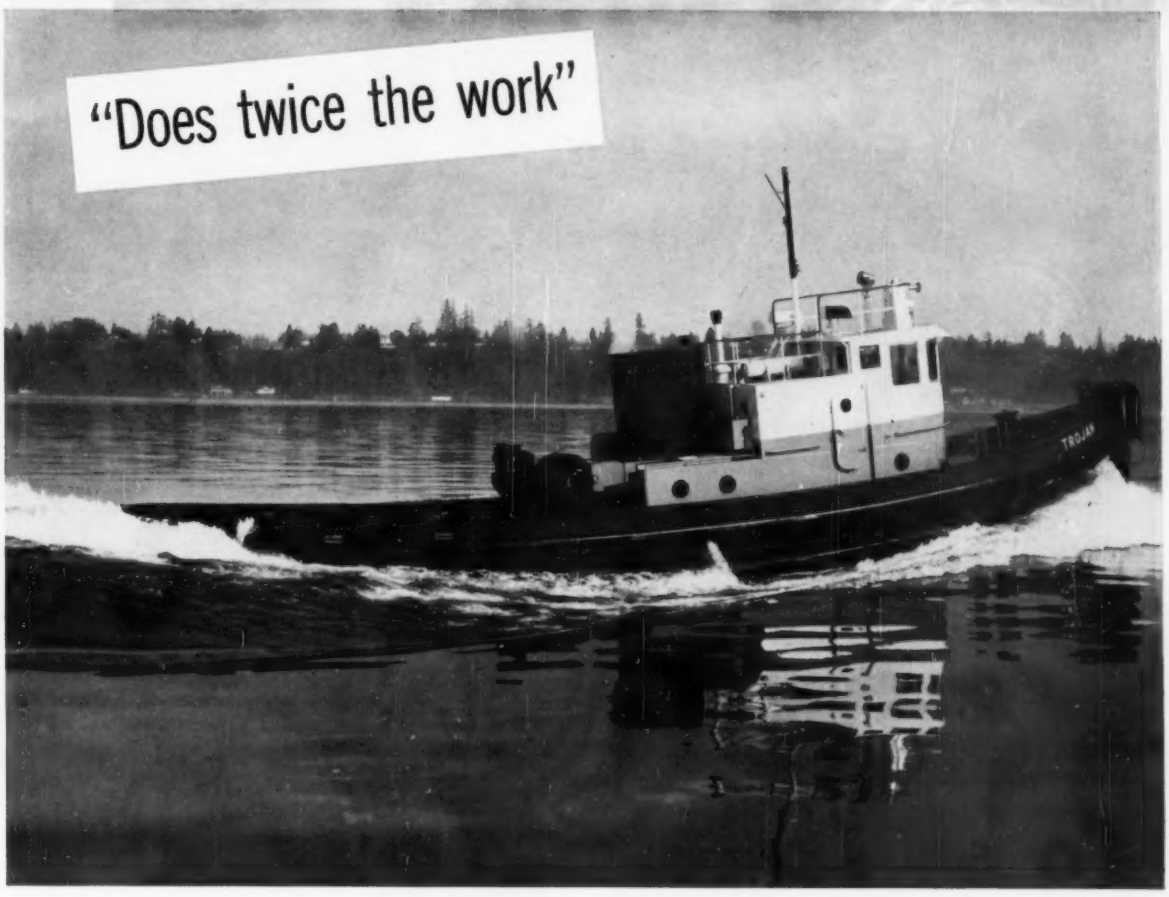
Indiana and Ohio have recently opened their turnpikes to the "Double Bottoms." But in doing so they've opened up some problems for truckers. The Double Bottoms (up to 98-ft long and overall load up to 127,000-lb) had to hold a minimum of 25-mph on all grades . . . and a minimum of 40-mph on-the-level. This presented some problems that were easily and quickly solved by the Cooper-Jarrett Trucking Company of Chicago.

C-J was one of the first freight haulers to get 98-ft Double Bottoms rolling over the Indiana and Ohio turnpikes. C-J has approximately 140 diesel-powered tractors operating between Kansas City and the East Coast. However, in order to meet turnpike regs affecting load, speed, special safety features and various equipment specs they decided to get themselves some new custom-built tractors that would take full advantage of top allowable weights . . . at top allowable speeds.

Order went to Hendrickson Manufacturing Company of Lyons, Illinois. For many years Hendrickson have specialized in design and fabrication of custom-built trucks and truck components. Hendrickson went to work immediately, engineering the special tilt-cab trucks and incorporating the turnpike required features—braking, steering, suspension, transmission, lights and last but not least, the Detroit Diesel 380-hp, 12-V-71.

(*Continued on page 37*)

GET REAL PRODUCTIVITY—GET A GM DIESEL



"Twice the work we did before with tugs of comparable power . . . wastes no time on the job . . . has the ability to do any job it's put on . . . definitely a high-production money-maker."

Those are just some of the things John Lauritsen, Traffic Representative for Puget Sound Tug and Barge Company, has to say about his company's GM Diesel-powered tug *Trojan*.

Talk to him some more about this 65-foot tug and he'll also tell you: "That *Trojan's* a highly maneuverable tug, something its skipper really appreciates when it's doing ship work. It will pick up an empty scow at nine in the morning—tow it 28 miles to the gravel pits near Steilacoom—return with a 1,200-ton load of sand and gravel and resume harbor towing—all in the same day."

And Mr. Lauritsen adds: "This GM Diesel-powered tug is very seldom down for any maintenance work—certainly you can call it a 'high-production' tug. It's practically foolproof and trouble-free, which means more productivity."

Enough said? Isn't that what you'd like to be able to say about your boat? If you can't, better see your GM Diesel distributor today—he's in the Yellow Pages under "Engines, Diesel."

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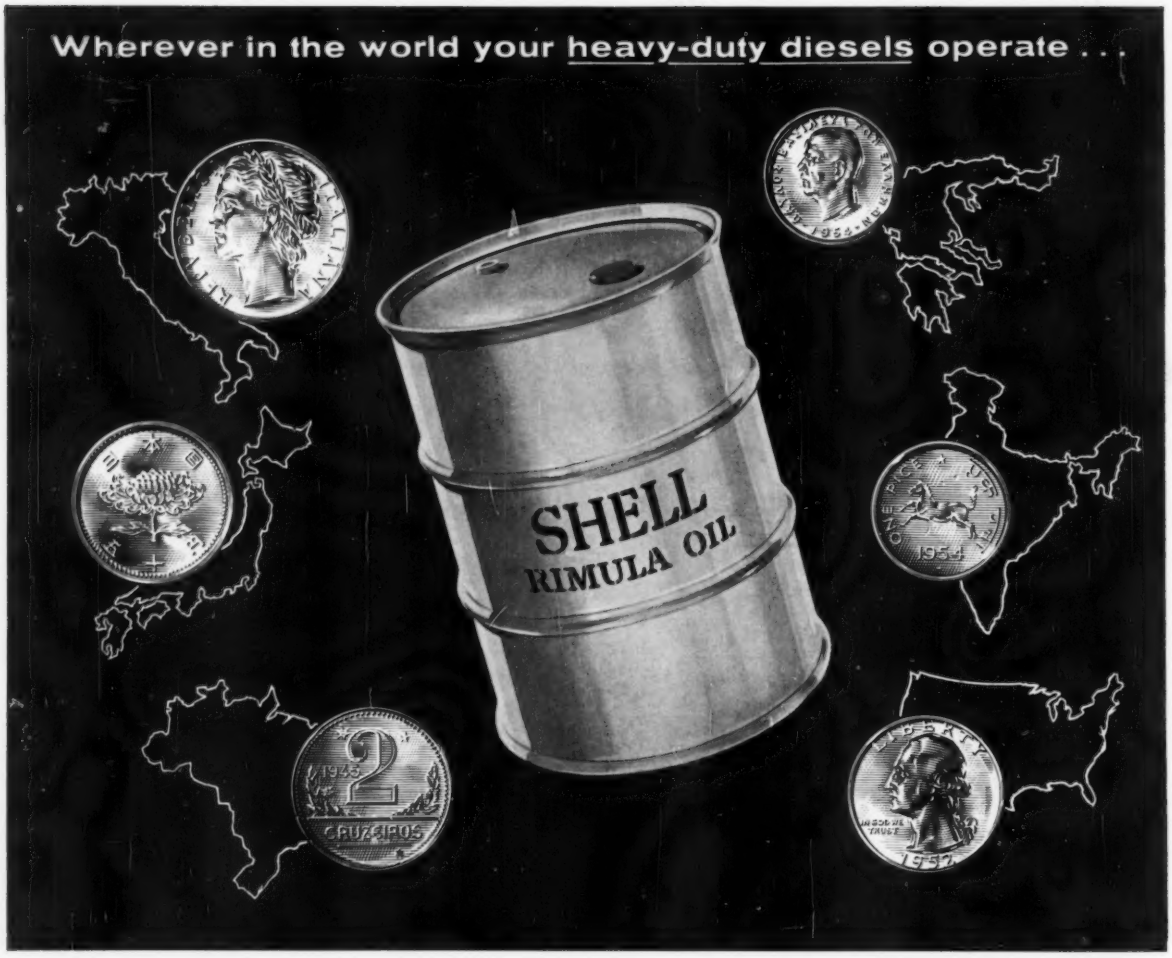

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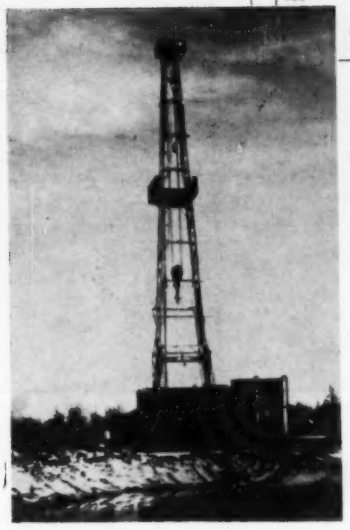


In the land of the midnight sun . . .

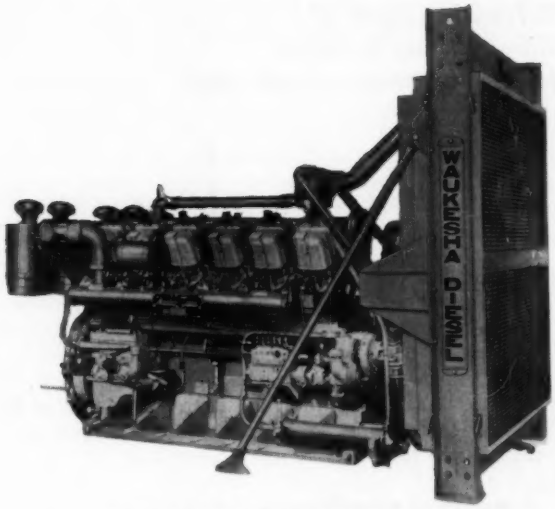
waukeshas work 'round the clock

Out in the middle of nowhere Drilling operations assume aspects of a military operation . . . and equipment selection becomes critical.

Up in Southern Alaska only five miles from the Bering Glacier the Clyde Hall Drilling Company from California is busy sinking an oil well under some of the most adverse conditions known to man. Sun shines only two and a half hours out of every 24 . . . rain piles up at a rate of 180-in. per year . . . fuel and supplies must be flown in . . . and the surrounding land is muskeg swamp, safe only when frozen.

It cost $1.5 million just to get ready for drilling—2 LSM's and an LST making the 3500-mile voyage up the coast from Los Angeles with three big 12-cyl Waukesha VLRDBU diesels and a National Type 110 rig and other necessary equipment abroad. Then there was a 23-mile road to be built . . . and a landing strip . . . and finally the drill camp itself.

With this kind of an investment, the selection of actual equipment to be used became critical—Clyde Hall Drilling Company didn't want breakdowns with harbors frozen, roads drifted over and landing strips "socked-in" with notorious Alaskan weather. Equipment HAD to be good.



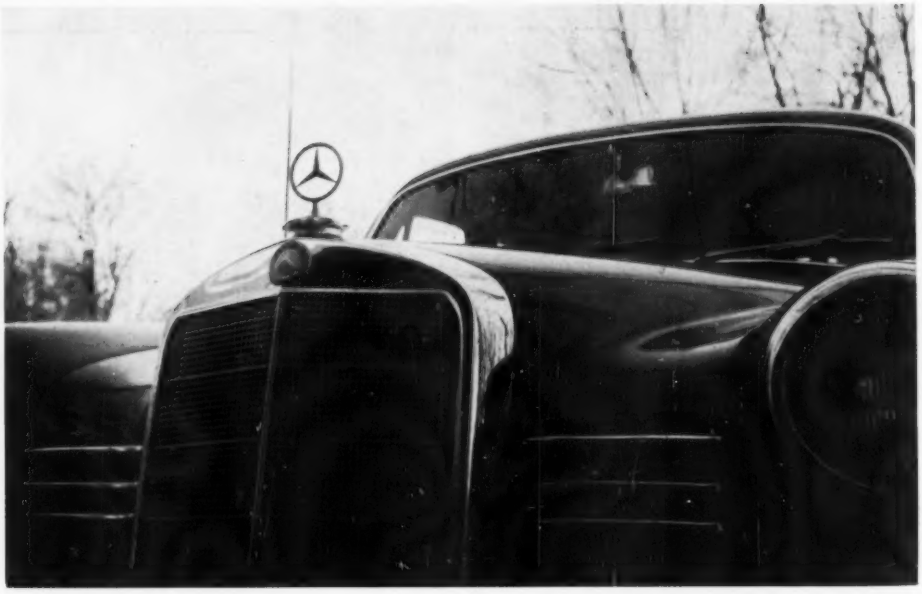
Three big Waukesha V-12's (725-hp each) supply power at Alaskan drill site.

Waukeshas Picked . . .

The three 725-hp Waukeshas picked burn 1000 gal. daily driving a National Type 110 rig . . . Type MS-27½ rotary, a 3-section drive group, a G-1000-B and a C-350 slush pump and the Kelly. They will work 'round the clock, seven days a week until the hole comes in.

Search for oil today is taking man further and further into the far flung reaches of the world. But wherever he goes, man must take his tools and equipment with him—and their reliability is becoming increasingly critical. This makes initial selection important . . . makes carefully scheduled maintenance mandatory.

Operating report:



by Brian P. Emerson
Editor, DIESEL POWER

Results with a Diesel Car

A report on driving a diesel-powered car appeared in DIESEL POWER, January, 1959. Here is a report of operation since that time, detailing costs and including comments on the simple preventive maintenance system used.

This is a real light-load, short-haul story. Back in July, 1958, I bought a 1956 Mercedes-Benz 180D for use as a personal car—and to evaluate at first hand practicality of the application of diesels to light vehicles. I've come to one conclusion; I like the car and you'd have a tough time getting it away from me. Of course, a 190D now . . .

As for other conclusions, here are the facts—judge for yourself. A preliminary report appeared in DIESEL POWER, January, 1959, and we'd like to bring this up to date . . . add some items of interest.

As background, the car had 30,661 miles on it when purchased. First step was to give it a good going over . . . do everything that had to be done. The only trouble found was in the electrical system. Apparently, generator trouble had developed in the past and a replacement was made, involving a new mount. The mount was a botched job and misalignment plus looseness had ruined the generator. This had affected the regulator and also put the battery on the bum.

This whole system was replaced. In subsequent detailing of costs, this expense is not listed. This is felt to be fair since there was no control. Normal maintenance might have prevented it. Everything else spent, once the car was checked out, is listed.

The best word to describe how the car is used is "hacking." Four miles to work, four miles back, running around town, driving to the airport where it might sit for a week, and a bare minimum of longer trips. As a result, mileage since purchased and for purposes of this report is only 10,744 miles. However, the total of 41,405 on the odometer is substantial enough to give more meaning to later comments.

A matter of records . . . .

Since one objective was evaluation, accurate records have been kept. Practicing what we preach, a simple but effective PM system was set up. Takeoff point in setting up service intervals was the builder's recommendation. For example, lube oil and filter changes as well as chassis lubrication are specified at 2500 miles. This was observed since this was a test although my instincts tend toward shortening this, particularly lube oil changes, in this relatively cold, dirty type of operation. However . . .

At 41,405 miles, engine has had no repairs. Power output has not changed to any noticeable degree . . . injection equipment, glow plugs have not been touched.

Two major indices of changes in engine condition are fuel and lube oil consumption. Accurate records of quantities purchased, keyed to mileages, were kept. These were plotted in terms of cumulative averages of miles per gallon for fuel and miles per quart for lube oil. The chart is shown.

Let's interpret what appears. First, fuel consumption. Figures on the first 3000 miles looked good . . . began to show an increase. In the preliminary report, this was attributed to improved driver techniques. Undoubtedly this is a factor is getting optimum consumption but it was not the answer here as evidenced by the decline to a steady average mileage.

This punches home the fallacy of short-term conclusions and the value of a simple running visualization of what's happening. After smartening up, I looked for the reason for this departure from the norm. Checking mileages against dates, the answer was apparent—when the car was a new "toy" every excuse was found to run it on relatively long trips. This is what pulled up the mileage. The flat, stabilized line is more representative of average operation, minor fluctuations being the result of slight changes of trip length during the particular period.

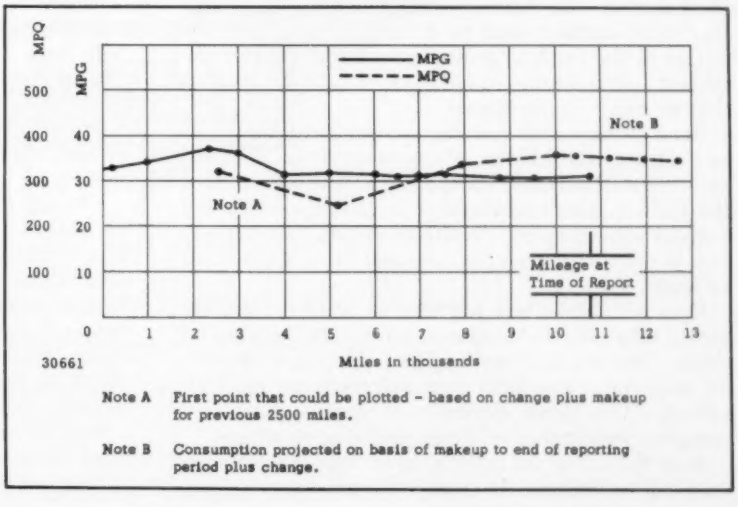
Present flatness of the fuel line establishes a norm. As long as there is no major change (unless explainable by changed operation) injection pump and nozzles are okay and there's been no change in the rest of the engine.

Lube oil consumption is a little more tricky. The first plotted point came up at 2500 miles. Total oil used—the 4½-qt change plus makeup—was used as a basis for figuring. Running from change to change without makeup would be 555.5 miles per quart. In the first and second periods, makeup was needed and the amount was increasing. This change was a signal to do something.

The garage floor told the story; it was an oil leak. As usual, it was hard to find and hard to get at. It was the valve tappet cover behind the fuel injection pump. With a little wrench-bending it was reached and tightened without pump removal. Immediately, makeup stopped.

Next oil change went the full 2500 miles without getting to the "low" mark on the dipstick. The line headed for the 555.5-mpq mark but remember these are cumulative averages and earlier poor performance pulled down the average. Then the line began to bend down again—makeup oil was being added.

The last period is projected on the basis of makeup to date plus the 4½-qt change at the end of the next 2500-mile period. Fact is, the oil will never make it; I'm going to change it. Why? Looking back to see what was bought and when, (the last two changes were to a multi-vis 10-30 oil. Performance to date indicates that in this one case, this particular oil is not right for this particular engine in this service. No broader generalization



Fuel and lube oil consumption are major indices of general engine condition. Simple, visual plot of these makes it easy to spot any changes from norm, take corrective action.

Note A — First point that could be plotted – based on change plus makeup for previous 2500 miles.

Note B — Consumption projected on basis of makeup to end of reporting period plus change.

can or should be made. Oil type will be changed.

Simple records can tell you a lot.

No change in power . . . .

How do I know? I've got a dynamometer hill. Close by is a good long hill. Experimenting when I first got the car, I found that if I hit a certain point at the bottom of the hill at 30 mph in 3rd gear, the car would pull it at full throttle, holding the 30-mph speed. In other words, the load just balances the power available.

This power indication is quite accurate and senstive. Hit the bottom of the hill at 32 mph and you'll accelerate; at 28 mph, speed will pull down considerably. Hit it at 30 mph but with two passengers and the speed will pull down.

So for all practical purposes, test runs have shown that power has stayed constant for the past 10,000 miles. The hill won't tell you how much power you are producing nor can you make corrections for "standard days" but results have good reproduceability. The big thing in maintenance is that you can get indication of "change" or departure from a norm.

This was shown to be true for fuel and lube oil consumption and is equally true of power. When change occurs in any or all of these three indices, it's time to do something. And with records you can analyze what to do.

Cost of operation . . .

Actual operating costs for the modest mileage are given in tabular form. Understand one thing—*all unit cost figures are on retail prices.* Also, some of the repair items, hoses and clamps and the fuel gauge, for example, would not recur each 10,000 miles. Tire costs are not included as the operating period has not been long enough to get any idea of what it will run. Tires have given no trouble.

Perhaps the most significant part of the cost picture is what does not show up in the tabulation. In a recent publication by one of the Big Three, automobile repair costs on the basis of 15,000 miles per year average $180.00 in the third year or between 30,000 and 45,000 miles. Here is a car with better than 41,000 miles on it with practically nothing done to it and a total repair cost $13.40 in the third, 15,000-mile period. And more important, performance records and inspection indicate that no repairs are imminent.

Road performance and the dynamometer hill show no evidence of deteriation of engine condition. The flat fuel consumption curve confirms this. It also shows that the fuel injection equipment is in good condition and coupled with complete absence of smoke, that combustion is good. This gives the rings and valves a clean bill of health.

Even with an oil leak and later an oil of too low viscosity, lube oil consumption is nothing to be alarmed about. After the leak was fixed and the proper viscosity oil used, the engine went 2500 miles without need for makeup. This shows capability of very nominal consumption and further confirms good ring condition.

As to the rest of the car, it's tighter than my other car with half the mileage. It's completely free from squeeks and rattles. Clutch operation is smooth and there has been no apparent change in floorboard clearance. Shocks are in good shape. At the time that the transmission and differential lube was changed, front wheels were packed. Brakes were checked while the wheels were off. Plenty of lining remained and the drums were in good shape.

OPERATING COSTS

Fuel		
Gallons used	334.6	
Average cost per gal.	$0.282	
Total cost		$ 94.24
Lube Oil		
Amount used, qt.	29.5	
Cost per qt.	$0.60	
Total cost		$ 17.70
Chassis Lube, Transmission, Differential		
Total cost including changeout of transmission and differential oil		$ 17.38
Filters		
Fuel		$ 2.00
Lube oil		$ 11.20
Antifreeze		
Two winters, 1 gal. each		$ 6.50
Inhibitor, Cooling Water		
One summer		$ 1.00
Repairs		
Faulty fuel gauge tank element		$ 8.40
Light bulbs		$ 1.60
New radiator and heater hoses and clamps		$ 3.40
Total		$163.22
Total Mileage covered by report		10,744
Fuel cost per mile		$0.00877
Total operating cost per mile (less tires)		$0.0151

In Europe they talk about 100,000 to 150,000 miles or more on these cars before major work. After over a year and a half of familiarization, I'm ready to believe it.

And now conclusions . . . .

Experience with this car has satisfied me as to the feasibility and practicability of diesels for light vehicles. This is an objective and accurate report of, granted, a limited period of operation. As mentioned, costs are based on retail prices. Such costs as original investment, depreciation, insurance and for tires are necessarily omitted. This is not a typical commercial operation and there is no way for me to figure them.

Original investment is about $3,600 for a new 180D with about a $280 premium included for the diesel. For other types and where repowering is involved, these figures will have to be developed. It appears entirely practical to amortize the vehicle over an eight to ten-year period. Insurance and tire costs should not differ appreciably from equivalent gasoline-powered equipment. With the operating figures given, at least a pattern for overall costs can be obtained.

Sharpen up the pencil. For vehicles of all weights from taxicabs to light trucks, diesels could mean real dollars and sense.

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Schwitzer Products are manufactured Internationally

Which is Diesel? No. 112 has Cummins JN-130 under its hood—gets 50% more mileage!

Diesels Shine in In-City Pickup Service

Early performance of two light diesels trucks promises long-range satisfaction and substantial economy.

story and photos by
Paul B. Harder

Asbury Transportation Company of Los Angeles has rung up some impressive operational figures with two Cummins JN-130-powered International diesel tractors used for short-haul trucking in the congested Los Angeles metropolitan area. After 15,000 miles of stop-and-go work, the two diesels are averaging 8.5 and 9.75 mpg respectively.

Clarence Soderberg, Asbury's superintendent of maintenance, discussed operation and maintenance of the two diesels candidly and in some detail during a DIESEL POWER visit to Asbury's Los Angeles depot. Carefully maintained fuel and maintenance records were used to document his observations.

"What have you sacrificed, Clarence, in terms of get-away power, handling characteristics and driver comfort to get mileage like this?"

"We were surprised. Actually, these rigs leave very little to be desired. We purchased eight other B-182A International tractors powered with the regular 6-cyl 155-hp gasoline engine at the same time, so we have something we can compare the diesels with pretty accurately. They are out-performing the eight gasoline tractors!"

"Do you mean they have more pick up or just that they're getting better fuel mileage?"

"Both. The diesel tractors handle the loads better and for that reason we have them on the longest and most difficult runs. They'll each make as many as 50 pickups a day in the process of bringing dry freight to our dock where its marshalled for long distance hauls. The men like the power of these JN-130's. They'd rather drive the diesel tractors."

"You say you're getting between 8 and 10 mpg with these dieselized Internationals. What are you getting with the gasoline tractors?"

"It runs from a low of 5.5 mpg to a high of 6.5 mpg. The loads they draw are about the same."

"How about noise and vibration? Have you had any squawks from the drivers about the actual comforts of the diesels compared to the gasoline models?"

"There is quite a bit of vibration, particularly at low idling speed, and exhaust noise is pretty loud. Drivers are getting around the vibration problem by keeping their engines from dropping all the way to idling speed and we're going to run our exhaust stack up behind the right rear of the cab to get away from exhaust noise problems."

"What difficulties did you have making room for that diesel in the engine compartment?"

"The entire installation on both tractors was made at the Cummins factory. We bought these rigs new just as they're standing. We can see that it was a tight squeeze, particularly lengthwise, getting that JN-130 into the engine compartment, however. They cut a 6-in. deep doghouse into the firewall to give enough length."

"Does this look like a good arrangement to you?"

"It looks like the best thing they could do without doing some extensive modifications at the front end of the chassis. The engine is as far forward as it will go right now and the only way they could make room for it was to put that recess in the firewall. We're gonna have some problems when we have to remove the head, but I think there's enough room for clearance."

"How about the radiator, clutch and transmission? What changes had to be made in these?"

"Both the diesel units have the same Fuller transmission and Rockford clutch assembly as on the gasoline rigs. As far as we can tell, we have the same radiators too. They had to move the hose connections and they added a surge tank. They did a little metal work around the right side of the radiator to provide an air cleaner intake, but that's about all."

"What has been the story maintenance-wise?"

"There hasn't been any. We've had a little water pump trouble with the gasoline engines but so far we haven't touched the diesels. We don't expect to have any trouble with them for a long time."

"What does the future look like for these two diesels?"

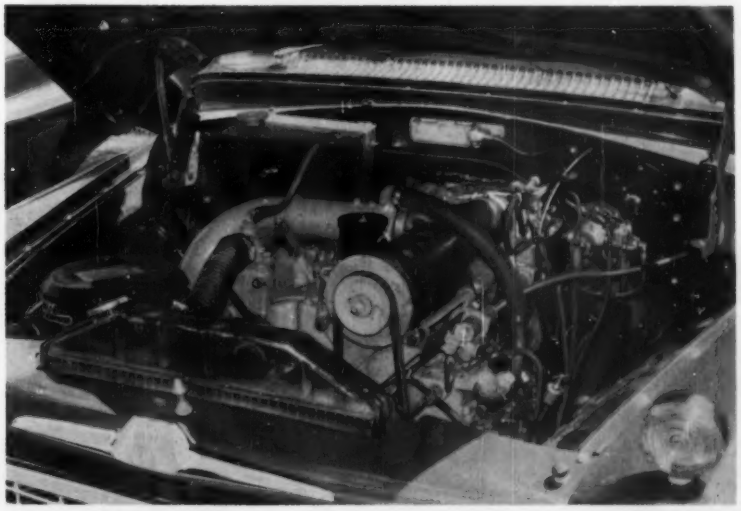
"We expect to get at least twice the mileage from these tractors that we get from the gasoline rigs and we don't expect to have the maintenance problems that develop as a gasoline engine starts building up hours."

"What do you think of diesels in general for your type of short-haul work?"

"The day of the diesel for short-haul work has already arrived. If you doubt it, look at those fuel consumption figures again. Before we had these diesel tractors we had a Volvo demonstrator in here for awhile and this Swedish rig worked beautifully, too. I don't know how soon we'll be getting more diesels for our short-haul work, but you can be sure we'll be running more and more diesels as time goes on."

Only major modification was 6-in. "doghouse" cut into firewall for longer engine block.

Tractors: International Harvester B-182A 3-ton.
Original engines: 6-cyl gasoline, 138-hp at 3400 rpm, 155-hp at 3600 rpm.
Diesel replacement: Cummins JN-130 6-cyl diesel, 130-hp at 2500 rpm.
Clutch: Fuller 5-A-43.
Clutch: Rockford CLA-2389-1AB
Installation: By Cummins Engine Co., Inc., Columbus, Ind.



Engine compartment of this International Harvester 3-ton tractor is filled to brim with engine. Surge tank is mounted on firewall face, air cleaner is dropped down behind radiator.

BARBER-GREENE specifies INTERNATIONAL Power

for world's leading line of asphalt plants!

Report from Guy Banister,
Chief Technical Engineer,
Barber-Greene Co., Aurora, Ill.

"We standardized on International diesels for Barber-Greene Continuous Mix Asphalt Plants in 1947, and owners' reports prove we made an excellent choice."

"For 30 years Barber-Greene Continuous Plants have played a major role in making asphalt paving the world's most used road surface. Since the 30's road builders have been able to produce a controlled high-quality mix in high volume at low cost, and that calls for *efficient power.*

"Because the whole paving operation depends on our plants for asphalt production, plant downtime can run as high as $5,000 hourly. And since engines on the plants operate under continuous load 8 to 10 hours daily—that calls for *dependable power.*

"Since Barber-Greene Continuous Mix Plants are highly mobile—often moving to 6 or 8 jobs in a season—that calls for engines supported by an *excellent parts and service organization.*

"International diesel engines meet Barber-Greene standards for efficiency, dependability, and parts and service support. That's why we standardized on IH power for these plants. Performance records over the past 13 years show that our customers, too, are satisfied International users."

You, too, can build into your products the advantages of International power. Check the complete International engine line—32 carbureted and diesel models from 16.8 to 385 max. hp. You'll like the one common feature of all 32 engines: fastest payback power for users. Just call or write International Harvester Co., Engine Sales Department, Construction Equipment Division, Melrose Park, Ill.

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A COMPLETE POWER PACKAGE

Today's Diesel Man . . .

(Continued from page 25)

Even without this responsiblity, Charlie's 45-man crew is kept busy—25 of them on nothing but truck repair and servicing. Since the open-pit operations began in 1948, Charlie's fleet of trucks have had to pull 112,000,000-tons of ore and waste up 7% grades that are alternately dusty and muddy. Servicing of tires, brakes, dump mechanisms, torque converters as well as the engines have been as much as his maintenance crew can handle.

"During a recent rainy spell," recalls Charlie, "our trucks were running hub-deep through mud. In a couple months' time we had to replace the brakes on the entire fleet, repair a lot of broken springs in addition to a regular maintenance and overhaul operation."

He Has Last Word on Purchasing . . .

In addition to overseeing this 'round-the-clock service and repair operation, Charlie Zache also has important purchasing decisions to make relative to the heavy equipment as well as its service and repair parts and equipment. One of the major diesel representatives in Arizona, commenting on Charlie's authority purchasing-wise, observed, "If Charlie doesn't like what you've got, you might as well stay home. He's about the last word on equipment."

When major investments are involved such as purchase of new haulage trucks at $70,000 each, Charlie is an important part of the group that studies the equipment and makes the final purchase decision. On matters concerning service and repair parts, Charlie's word is law.

"It would be hard for it to work any other way," states Charlie. "I'm with this equipment all the time —am the one who is responsible to see that it keeps running. One of the things I'm paid for here is to make proper decisions about our mechanical equipment, tools and supplies."

Charlie Zache is looked upon as one of the best maintenance men of heavy duty excavation and haulage equipment there is in the business. It follows that Inspiration's equipment experience is closely watched not only by competing firms, but by equipment manufacturers as well.

Open Pit is Product Proving Ground . . .

"We have several firms who have us field-test their products," point out Charlie. "For sometime we've been working with Cummins in the development of their new turbocharged V8 diesel. We also worked closely with the manufacturers of torque converters when those were being developed for haulage truck use. We have recently done some experimental work with air cleaners."

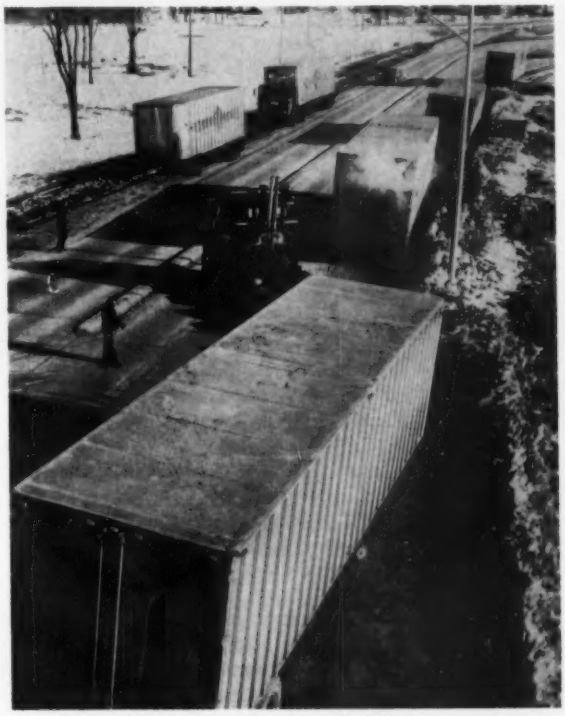
Charlie's attitude on the use of his equipment for field testing is a significant. "The only way to get on top, and stay there, is to study new products and talk to the manufacturers' engineers" Charlie chewed on his unlit cigar for a few moments, then explained, "It's all part of getting the muck out."

Truck Customizing . . .

(Continued from page 26)

These were non-turbocharged diesel engines—ones that would give C-J big 12-cyl power in a compact 6-cyl length, giving a minimum weight per horsepower.

What else went into these special Hendrickson-engineered toll road truck chassis? Specifically, they were



Make-up and break-up for Double Bottoms takes place at Exchange 15 on Ohio Turnpike.

equipped with Timken FE-900 front axles and Eaton 38-DSA rear axles. And Fuller R-1160 Roadranger Transmissions were tied into DD's 12V-71 . . . and Spicer 15½-in., 2-plate clutches were used. Special spring-type parking brakes were attached to both rear drive axles. They also act as a brake in case of emergency. Power steering? None.

Just seven weeks later, the first truck was delivered to C-J . . . and soon afterwards the company's first Double Bottom with full allowable load was rolling down Indiana's toll road.

How's it doing?

Well, as we said, speed regs call for a minimum 25-30-mph on grades. C-J's new customized Double Bottom takes the steepest grades at around 38-mph! And as for on-the-level, there's a minimum requirement of 40-mph. But C-J's rigs with full allowable loads have averaged 45-mph, and top turnpike speed of 55-mph for trucks is easily maintained on the straight and level portions of this 397-mi route through Indiana and Ohio.

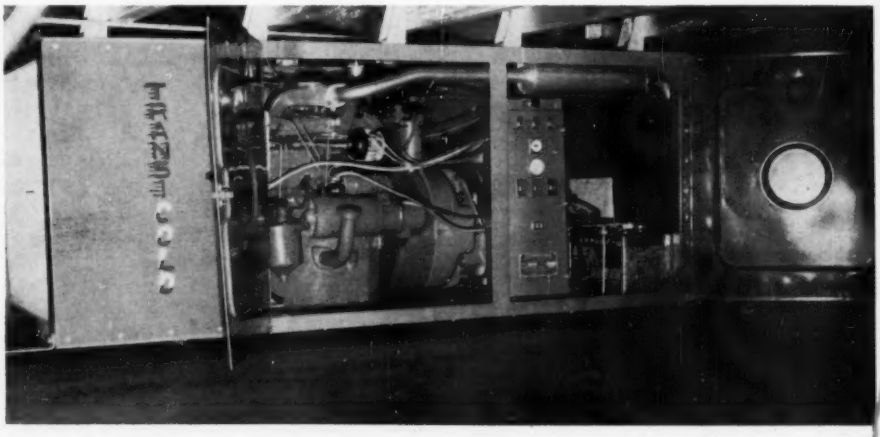
diesels keep frozen foods frozen

Diesels replacing gasoline and LPG on "Reefer" trucks . . . Cutting fuel consumption, upping engine hours and ending driver's caretaking duties!

Everything from the orange juice you gulp down in the morning . . . to cherry pie al'mode at supper comes frozen these days. Meat, poultry, vegetables, baked goods and ice cream—they all travel a good part of the way to your table aboard refrigerated "reefer" trucks. Over 5-billion tons of frozen foods tumbled into American housewives' shopping carts last year. The trend toward frozen food is definitely on the increase.

What does it all add up to?

Just this—an increasing need for higher-capacity, dependable and economical truck refrigeration, especially in the seven to 10-ton ranges. State's codes on zero delivery of these frozen goods is tightening up month by month . . . and goods carried by today's big reefer rigs require increasingly narrower temperature spreads, often times cooling and heating during the course of a single run. In the face of ever-stiffening competition, the trucker can't afford to lose his load . . .



Perkins-powered B-25 weighs 1625-lb, measures only 67-in. by 28-in. Keeps 40-ft van low as —15°F. It's designed for automatic or manual operation.

Again, what does it all add up to? Just this—*a substantial market for the diesel!*

Last month DIESEL POWER paid a visit to Transicold Corporation of Montibello, California, one of the nation's leading manufacturers of transport refrigeration equipment.

We talked with Reid White, vice president at Transicold. He told us how two years ago during the summer of 1958 they first began testing a 35-hp Perkins Four-99—letting it drive one of their generator-compressor units. White mentioned that while highway weight requirements might appear to place a premium upon light engines and compressors, this was not always so. Continuous operation, he pointed out, plus trailer vibration, demand the kind of maintenance factors obtainable only with heavier equipment.

"Tests with those first few Perkins-powered units far exceeded our greatest expectations," White told us. Since then, they've virtually revolutionized Transicold's whole operation. This 7½-ton diesel-powered unit has moved up to the Number one best seller, nosing out their 5-tonner!

On the basis of those early tests, production of the Transicold Model 230 refrigeration unit was started early in 1959. Today—scarcely a year later—over 70% of Transicold's production involves this Perkins-powered generator and compressor. Only in the smaller reefer units are gasoline and LPG engines still finding a market. The reasons for this rapid shift is ascribed to maintenance and fuel consumption factors.

Engine Hours up—Fuel Consumption down!

"We used to feel we were doing well to get 3500-hours on a gasoline engine and 6000-hours on an LPG engine before a major overhaul," reflects general sales manager C. F. "Cap" Winslow. "Now we're counting on 12,000-hours with these diesels and we may find that we can get 20,000 to 30,000 hours!"

Winslow notes that fuel consumption has shown an equally dramatic improvement. Where the Four-99's averaged between 0.3 and 0.4 gallons-per-hour of No. 2 diesel fuel, the gasoline engine of comparable output was consuming 1.3 gallons-per-hour.

Major factor contributing to these maintenance and fuel consumption features is Transicold's method of operation of the diesels. The engines run continuously while the reefer is in use—from the time van is loaded until it is unloaded perhaps a day later. During much of this time, the engine "idles" at 1100-rpm. When the thermostat calls for more cold (or heat), an energized solenoid jumps the rpm to 1900. With a torque peak at 2000-rpm and an approved continuous-use rpm of 3000, it is not hard to understand why Transicold officials look for some phenomenal operational experience with their diesels.

Adapting the Diesel . . .

Engine is controlled electrically from thermostatic sensing elements. Modification of the fuel control system were only necessary to the point where speed settings were selected in accordance with the refrigeration or heating requirements.

Engine, generator, compressor are carefully tested.

Only modest alterations of the Four-99 were required for use with Transicold's generator and 7½-ton Carrier compressor. For instance, forward of the diesel are the refrigerator condenser and the engine's radiator. To provide the 5500-cfm air necessary to adequately cool the refrigerator condenser, a 6-blade fan on a special mounting bracket has been installed.

An integral part of all Transicold highway units is the firm's patented permanent magnet brushless generator that turns out 60-cycle 120-volt current at the lower speed setting and 90-cycle current when the engine is running at "fast cold" or "fast heat"—1900-rpm. A special bellhousing manufactured by Perkins was needed to adapt this generator to the engine.

Mounted behind this small generator is a 5F30 Carrier 296-cu in. 3 cyl compressor. Nominally rated 1½-ton at 1750-rpm, this compressor actually has a rating in excess of 8-ton at the unit's top operating speed of 1900-rpm.

Known as the Transicold Model 230, this diesel-driven generator and compressor weighs 1625-lb (compared to 1465 lb and 1565 lb for similar capacity gasoline and LPG units) and is packaged in an all-enclosed steel cabinet 28-in. high, 31-in. wide and 67-in. long. The whole unit is suspended beneath the refrigerator van chassis. Aluminum doors on each side of the package provide access to the engine, generator, compressor and control panel.

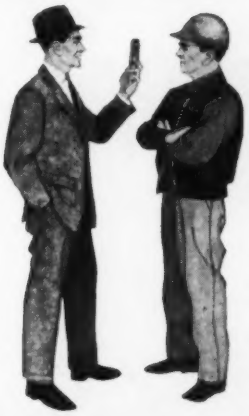
Its Reliability, Economy, Performance . . .

Truck drivers are relieved of responsibility for operation of the unit while on the road. The thermostat, electric relays and solenoids automatically maintain van temperature to within less than 2°F of thermostat setting. Three pilot lights mounted on the nose of the trailer advise the truck operator of the unit's cycling operation and warn him of high water temperature. A drop in lube oil pressure in the engine automatically triggers a quick-close valve on the fuel pump which stops the diesel.

According to one of the nation's leading highway haulers—Western-Gillette in Los Angeles—the dieselization of the refrigeration units has been a complete success. With 40 of the Perkins-powered Transicold

(*Continued on page 57*)

RED, HOT AND STANDARD



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Get all the facts about new PREMIER Diesel Fuel. Call your nearby Standard Oil office. Or write **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**

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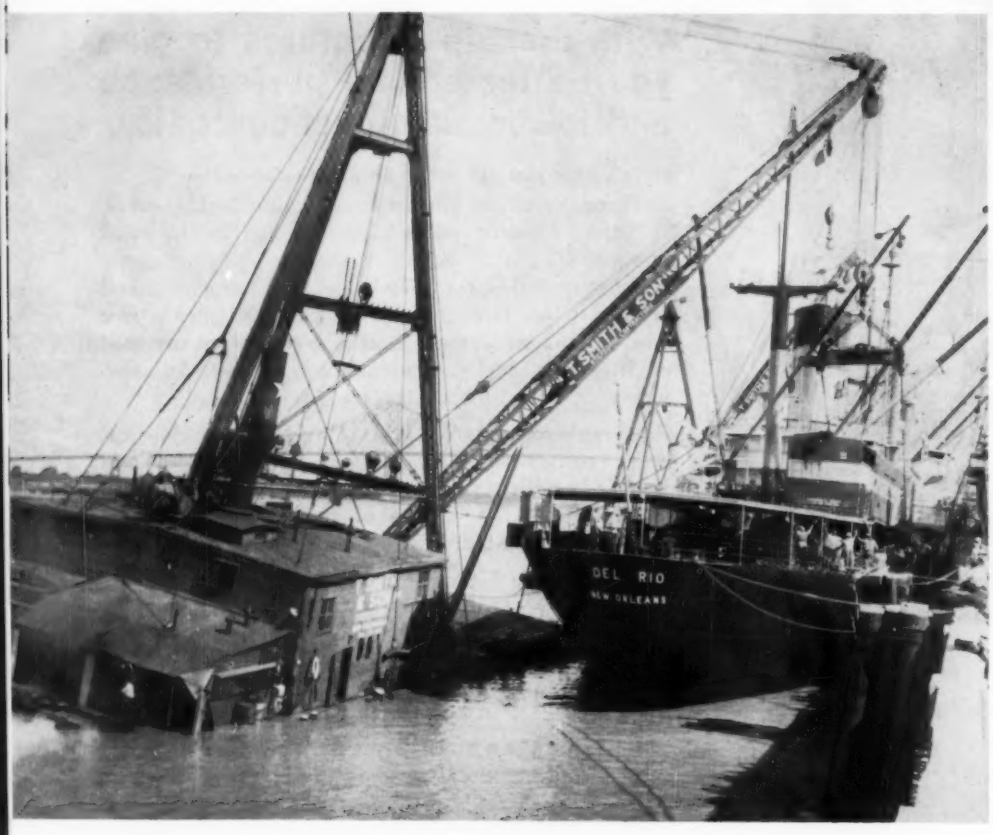
Here are the 7 big features

1. Anti-rust additive.
2. Balanced volatility—for full power and clean burning.
3. Cetane—for easy starting, good performance.
4. Free flowing—even in cold weather.
5. Low sulfur—less wear, reduced deposits.
6. Lubricates and seals injectors.
7. Distinctive red color.

You expect more from STANDARD *and you get it!*



First step was loading the cars aboard a freighter in New Orleans for the ocean voyage to Brazil. All 11 had been brought to this Louisiana port from various overseas locations where they were no longer needed.

DIESELS SUPPLY EMERGENCY to drought-ridden BRAZIL

When the river that fed their hydro-electric plant dried bare and dusty with only an occasional stagnant pool left, Brazilians called for help . . . and 11 GM 1000-kw Mobile Diesel Power Cars came 3000-mi to the rescue.

Just a year ago this month a severe drought brought about a critical electrical power shortage in Belo Horizonte, capital of the state of Minas Gerais in Brazil. American & Foreign Power, the company that normally supplies hydro-electric power, got to work immediately—bringing in 11 General Motors Model M-16 1000-kw Mobile Diesel Power Cars. These cars combine an extremely low cost per kw with maximum mobility—there's no tie-up of dead capital.

Arriving in Belo Horizonte, Brazil the M-16 Power Cars were lifted onto concrete piers . . . journey from Brazilian port city of Rio de Janeiro was made on special 1.60-meter gauge railway trucks that fitted local track.

POWER

First seven are already installed . . . won't be long now before lights go on again in Belo Horizonte. Note special track arrangement used to accommodate both standard USA railway gauge as well as Brazilian 1.60 meter trucks.

Connecting up — all 11 were on the line in only 55 days. They'll operate around the clock with only a 3-hr shutdown once a week. When emergency is over they'll be used for peaking . . . and emergency service to conserve water during future droughts.

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*Ryder System of Miami, Fla. is made up of a large motor common carrier operation and a vast national rental and leasing network. It owns close to 25,000 vehicles. The Miami Model Shop is the first experimental model shop of its kind in the country. It is designed and engineered to test new equipment and techniques to achieve maximum results with a minimum of lost motion.

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Snow covered Andes make spectacular backdrop for A-C HD-21's.

Allis-Chalmers Crawlers Help Electrify Chile

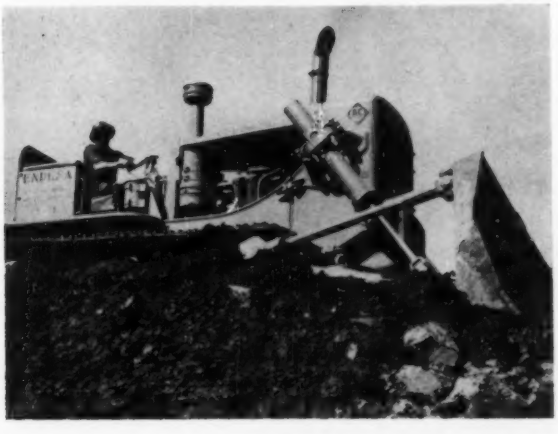
HD-21's work round-the-clock pushing earth and rock for hydro-electric dams high in Chilean Andes

High in the thin air of the Chilean Andes, Allis-Chalmers crawler tractors are hard at work bucking altitude, rock and extremely tough terrain. A-C's HD-21's are carving canals, building earthfill dams and preparing sites for future hydroelectric plants. It's all part of Chile's stepped-up electrification program—a program that when completed will deliver a combined output of 131,000-kw of electrical power! Bringing lights where lights have never been before.

Largest installation is the $18-million Central Isla Power Project, located in east-central Chile. Water from the Cipreses and Maule Rivers is being harnessed here to supply a new hydroelectric plant. An extensive system of canals and tunnels are being carved out of the mountains to tap these rivers.

Currently there're 21 A-C crawlers on the job here, including 15 HD-21's, four HD-6's and two HD-5's. These HD-5's—working up here in the mountains since 1953—have chalked-up approximately 15,000-hr. And *they're still at it!*

Two upstream earthfill dams are being brought-up to crest height specifications here at Isla. And the canal intakes of both rivers are now being completed. This canal job involves about 745,000-cu. yd. of earth moving—650,000-cu. yd. of which has already been moved. Two new HD-21 turbocharged tractors are spearheading plant site preparations at Isla—working, by the way, in just about 100% rock! During the last several months these new HD-21's with A-C's famed 21000 engines have operated on 24-hr a day schedules with only stops to change operators, refuel and take care of preventive maintenance. "That's one thing we *have* to stop for," explained Isla Power Project's diesel man. "If we didn't we wouldn't be in business."



HD-21's were pulled from regular chores for clean-up and rescue work during recent Chilean earthquakes.

Well Driller (H_2O) Converts to Diesel

Puts "330" Ford diesel into 25-ton portable drilling rig—gets power on-the-job and over-the-road.

Power at the site and for over-highway moves is provided by Ford "330".

Out in Southern California, a water-well drilling contractor has dieselized his heavy-duty truck with its portable drilling mast. Since the diesel has taken over as the truck's prime mover and also as the power source for drilling operations, this contractor reports impressive cost savings with excellent, uninterrupted performance.

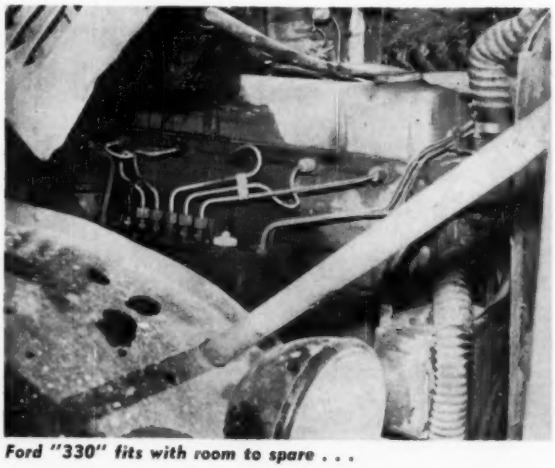
Bersch Bros. Water Well Drilling Co. of Escondido, Calif., one of southern California's leading water-well drilling contracting firms, replaced their Reo trucks' heavy-duty 6-cyl. gasoline engine with a "330" Ford diesel. Engine acts as prime-mover for the 25-ton portable drilling rig when it's being driven over the highway. On the job, this same engine, driving through a PTO out of the standard Reo transmission, rotates the rig's rotary table and drill pipe . . . also powers a wire line reel used to raise and lower the drill string.

Though packaged dieselized drilling units are not uncommon in the water-well drilling contracting business, this is probably the first instance in which a heavy-duty gasoline rig has been repowered with one of the Ford diesels. To make matters even more interesting, the complete diesel installation was made midway through a drilling job many miles from the nearest major equipment repair center. The installation has operated faultlessly during the year it has been in operation.

The original Reo engine was a 6-cyl. Comet model. As a prime mover, it drove through a 5-speed Reo transmission and a 2-speed rear end. Though not specifically designed for drilling operations (the truck was modified for this purpose by Bersch Bros.) the gasoline engine and drive system had served this purpose for several years.

Easily Converted . . .

Despite the fact that the installation was made on short notice and in-the-field, only minor difficulties were encountered during installation. The "330" Ford 6-cyl. diesel is approximately the same length as the engine it replaced and over 100-lb lighter. Modest torch work was necessary to alter the front support and trun-



Ford "330" fits with room to spare . . .

nion. Recess in the fire wall had to be moved back 3-in. Aside from these changes, no structural alterations were required.

Original clutch was replaced with a Ford F-7 clutch. Bell housing (with an adapter) lined up perfectly and shaft-length presented no problems. The original radiator was retained and hose connections worked out satisfactorily without modifying the outlets.

Pleased by Performance . . .

Operationally, the dieselized well-drilling rig is an improvement in just about every department over the same unit with its original gasoline engine. With a top rpm of 2250 and a torque peak at 1600-rpm, the engine has good lugging power—well suited for the type of over-the-road work required of a heavy water-well drilling rig. These same characteristics make it ideal for occasional heavy lifting and low-speed rotation when the engine is being used in drilling work.

When making a "round trip"—removing up to 600-ft of 20-ft lengths of pipe, replacing the bit and returning the string to the bottom of the hole—the diesel is revved to 2200-rpm then cut to 600-rpm idling again and again. In the process of either running the drill string in or out of the hole or rotating the string while the hole is being made, the engine is running continuously.

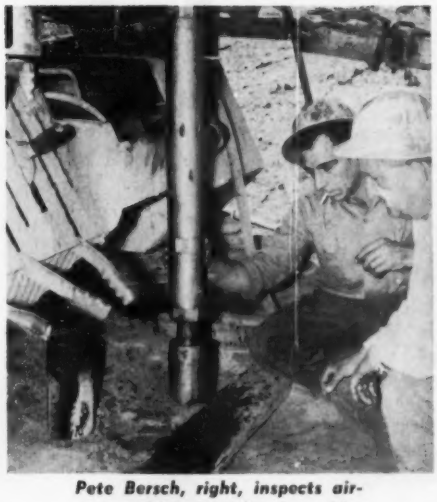
As mentioned, the "330" diesel has operated, both over-the-road and on the hole, with power to spare. But it is its relative economy that has made the biggest impression on driller, Pete Bersch.

Seven Gallons vs Fifty . . .

Savings realized are mighty impressive indeed . . . in fact, so impressive as to require comment. On top of the savings inherent in diesel operation and being documented every day, additional savings result because this diesel is a better match for the particular service and work cycle than was the gasoline engine. Regardless, the savings are real and go into the contractor's pocket.

According to Bersch, over-the-road mileage is in the 10 to 15-mpg range in contrast to the 5-mpg obtained with the original gasoline engine. While drilling, the diesel consumes from 5 to 7 gallons-per-day, depending on speed of the operations and the number of "round trips" involved. Similar operation with the 6-cyl. gasoline engine consumed 30 to 50 gallons-per-day.

. . . cuts operating costs by 80%!



Pete Bersch, right, inspects air-operated bit. CAT diesel provides air, "330" rotates drill string.

"Fuel economy like this," points out Pete Bersch, "is enough to pay for this engine in a couple of years. On top of this, consider the savings in maintenance and also in lack of down time. Such things as spark plugs points and condensers cost money and moisture on the electrical system early in the morning has held us up a lot."

Standard Ford lube and fuel oil filters, starter, generator and air cleaner are all used on the diesel. They fit, with room to spare, under the truck's hood.

A 4-blade pusher fan that provided excellent cooling during drilling proved unsatisfactory for obvious reasons for highway travel. It has been replaced with a 2-blade puller and Bersch believes that a 4-blade puller would work even better.

It all adds up . . .

As Southern California well-driller Pete Bersch says, with savings like these being realized from his repowering, it looks like the investment will be paid off in a few years. This refers to the "total" investment—but offsetting a good part of this investment is the fact that Pete Bersch *had* to spend some money anyhow. He either had to get a new engine . . . or he had to expect heavy expenses on his old equipment that was tired and worn out.

So the "net investment is lower by whatever this cost was and therefore will be paid off that much quicker. Large part of the savings to pay off this investment is due, of course, to diesel operation. The rest? To better, more-suitable equipment and better performance.

Is your equipment efficient and best-suited for the job? If not, better look into repowering.

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A precision-built liner for a General Motors Diesel engine

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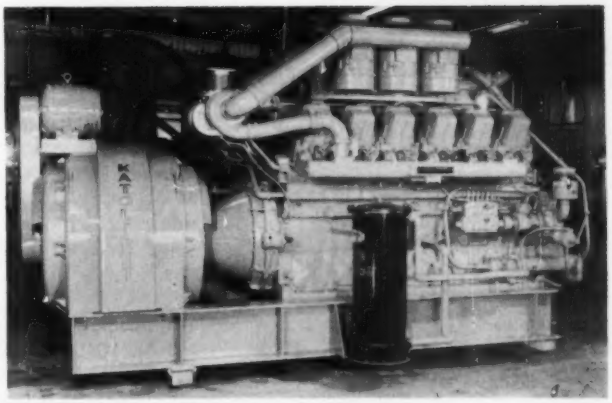
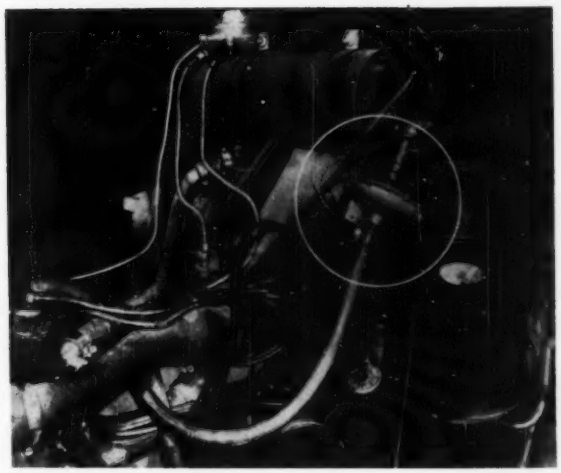
diesel power new products

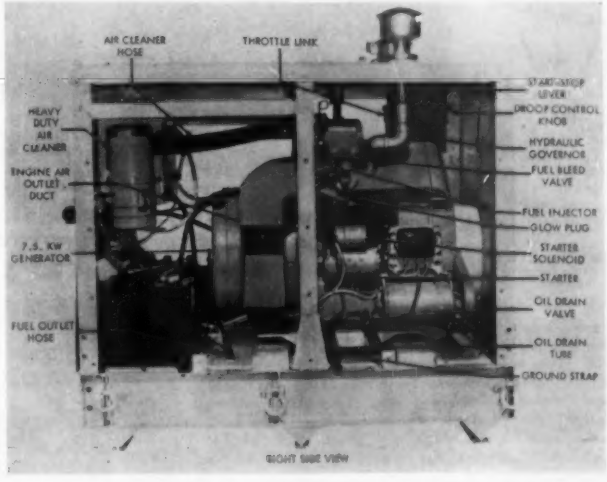
This 400-kw Katolight (500-kva, 3-phase, 480-volt, 900-rpm) generator set uses a turbocharged Waukesha diesel (VLRDBCSU) as its prime mover. Similiar Katolights currently supply emergency power at US Bomarc missile bases . . . many airbases. Civilian uses include standby service for utilities, in hospitals and other institutions.





"Level-Stat" Signals Operators of impending cooling system troubles *before* damage is done to the engine. Armbrust Automatic Corporation's device is sensitive to coolant level and circulation flow . . . warns of water loss or a bad water pump or air-in-water condition affecting circulation. Anticipates trouble . . . gives protection beyond that possible with thermostatic devices alone.

Powers Missile Incubator! American Marc's prototype 7.5-kw diesel generator set is undergoing tests now as the primary power source wherever missiles are being moved—powering the special missile heaters in planes, trains and trucks. Precise, dependable power prevents missiles from "catching cold." AMARC's static-excited 2-cycle engine-generator set weighs 650-lb.



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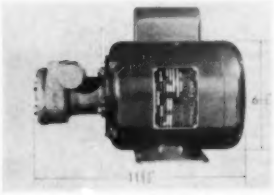
MORE NEW PRODUCTS FOLLOW ►

(Continued from page 49)



Tuthill Pump Has New Line

Tuthill Pump Co. has added the new series 56 pump and motor combination to its line. This further extends its extensive coverage of compact pump and motor combinations for use in hydraulic, lubrication, oil burning, fuel transfer and other services. With overall dimensions of under 7 x 12 in., the combination includes motors in the NEMA 56 series ranging from ¼ to 1 hp in either single or 3-phase. These may be combined with a selection of five different pumps with capacities from 20 to 360 gph.

Thinking of Switching More Equipment To Diesel?

If you are—better get yourself one of GM's handy slide rule computers. Quick, easy and accurate way to compare fuel savings (gasoline vs diesel) for your particular required horsepower. Another GM computer gives the truck performance you can expect from diesels—torque, speed, gear ratio . . . figures the grade factor, tractive effort . . . hp necessary to overcome road, grade and wind resistance. Gives solid, helpful information you need to make up your mind.

Diesels Hand Started In Only 10-Seconds!

Here's a new English import—an inertia starter that lets you start diesel engines in about 10 seconds. The device, weighing 73-lb, is designed to be used on diesel engines up to 6-cyl in place of the standard electric starter. Diesel Injection Sales & Service, Inc., is U.S. agent for this Simms Motor Units Ltd. product.

New See-Thru Bag From Wix

Now you'll be able to see at a glance just which filter you're picking up from the bin. Wix has a new, improved method of packaging diesel fuel oil filter cartridges. Each Cartridge is now encased in a tough, transparent, Polyethylene envelope. It's thermal-sealed to prevent any contamination of the cartridge by dust or moisture. Additional benefit, says the manufacturer, is ease of identification.

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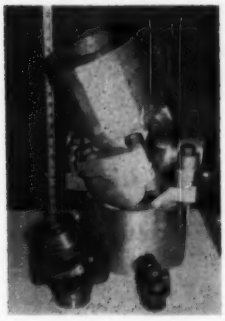
New Look For Reliance's Tach

Last month's DIESEL POWER carried an interesting 2-page announcement ad from Barbour Stockwell Instruments on the major redesign of their Reliance Tachometer. The new design features greatly improved readability—a modern, up-to-date look achieved by Clifford O. Stubbs, prominent Boston industrial designer. It incorporates an easy-to-read GLO Point indicator and quick vision scale. According to Mr. Stubbs, the new design should make this tachometer more easily read from a distance, or under adverse visibility conditions.

"Prototypes of this new Reliance tachometer have already met with enthusiastic acceptance by engine, equipment and machinery builders," states B.S.I. Sales Manager, N. B. Perkins. "Nor is this 'new look' the only improvement we have made with the introduction of this tachometer. In addition," he continues, "an expanded research and development program over the past two years has resulted in an improved, more rugged, more accurate and longer lived instrument."



A Real Big Universal Joint!

Rockwell-Standard Corporation's Universal Joint Division has announced production of the largest universal joint ever to come off its lines. Designed chiefly for heavy-duty industrial driveline applications, it is available as a plain or double joint or assembly.

Company engineers claim there is nothing on the market that will equal its capacity for the swing diameter of 13½ inches. Maximum torque capacity (using a safety factor of 10 to 1) is 162,000 inch-pounds, and breaking factor is 600,000 inch-pounds. New Blood Brothers® Model 150WB uses needle bearings and can be assembled and disassembled by installing or removing four bolts.

Use your dp Reader Service Card.

Bendix Has New General Purpose Filter Line

You can now get from Bendix Filter Division of the Bendix Aviation Corporation a new line of general purpose filter assemblies, Series 3100, for use in filtration of most fuels, lubrication oils, hydraulic fluids, air and other gases and liquids. Available with five different element materials, the new series has pore size ratings from two to 100 microns. In addition to wire cloth and sintered bronze, resin-impregnated cellulose is used in pleated sheets, as stacked washers and as helically-wound ribbons. Make inquiries if you can use these industrial hydraulic and pneumatic power systems, lubricating oil, diesel fuel or other types of fluid flow systems.

Metal Patcher . . .

Got some broken machinery around? Well, here's a new low-cost epoxy repair kit that may be just what you're looking for to make that machine or cracked pipe good-as-new! Devcon Corporation's new casting and molding compound comes as a putty . . . and also in liquid form. "Devcon" reportedly is great for bonding metals and woods and ceramics. Also can be molded to make that new tool for the shop. Simple to use—no heat necessary, hardens in 3 hours ready for drilling, sawing etc.

Cleaning Your Fuel Tank?

Here's a product especially designed for cleaning tanks which have had bunker fuel or other oils. Simply spray some Bardsad emulsion cleaner on all surfaces of the tank—using a pump and spray nozzle. Helps prevent rusting of steel surfaces.

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diesel power new literature

Data on Balancers

Balancing problems? Tinius Olsen Testing Machine Co.'s new 20-page Bulletin 60 describes two complete lines of static-dynamic balancing machines and also discusses the nature, causes and correction of unbalance. Descriptions and diagrams of four different balancing methods . . . compensator, nodal bar, pivoted cradle and electrical network . . . are given.

The Olsen compensator and pivoted cradle machines, as described, include special adaptations for jet engines and components and automative engine components. It also describes completely automatic balancing machines.

Ready Reference a Feature of new Lenz Catalog

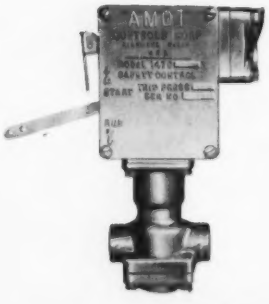
Specifically designed for ease of reference, the new 118-page, fully-illustrated catalog of original equipment and replacement tube fittings is easy to use from its colorful, carefully-compiled index to the end.

Opening flat when in use, the book boasts specification tables accompanied by actual-size cut-away drawings. All dimensions on the product illustration are letter-keyed to specifications and dimensions in the table.

Featuring the exclusive Lenz "O-Ring Seal" fittings made by the Dayton, Ohio company, the material covered includes Lenz J.I.C. "O-Ring Seal" patented tube fittings, S.A.E. "O-Ring Seal" patented fittings; J.I.C. 47° 2- or 3-piece flare tube fittings, S.A.E. 37 deg. 2- or 3-piece straight-thread flare fittings, pipe fittings, valve fittings, tubing and accessories.

DO ENGINE CONTROLS INTEREST YOU?

Then—call or write AMOT for the most complete selection of rugged, reliable, Safety and Thermostatic Controls.



Ask the AMOT representative for information on the new Model 2800 Safety Control.

AMOT CONTROLS CORPORATION

FIRST ST. & NEVIN AVE. RICHMOND, CALIFORNIA

Representatives in Principal U. S. Cities

Automatic System Keeps Power Lines "Hot"

Lumen, Inc., Joliet, Ill. is telling all about its new design refinements in its automatic, magnetically-controlled start-stop system for electric power switching operations involving standby units. For unattended facilities and installations requiring automatic switching, this unit monitors both primary and secondary power sources, performing all necessary switching to insure a continuity of power.

Going even further, the unit anticipates! It monitors for deterioration of primary service, replacing with auxiliary power before the primary source fizzes out completely! With the primary power once again restored, the switching group automatically shuts down the auxiliary system, returns load to the primary system and resets itself to anticipate further primary interruptions.

Just to cover all situations, the switching group will also lock out the auxiliary system and actuate a remote alarm circuit if both primary and auxiliary sources fail!

Use your dp Reader Service Card.

International Nickel Booklet, a Construction Industry Guide

Here's a fully-illustrated 37-page guide slanted for specific use by those involved in design or fabrication of machinery for the construction industry. The four sections of this new booklet, "Nickel Alloy Steels and Other Nickel Alloys in Engineering Construction Machinery," deal with properties of materials, power components, motive units, and machinery. Supplemented by photographs and technical data tables, the booklet includes a full chapter devoted to the specific applications of materials to component parts of diesel engines, brakes, gears, clutches, fluid couplings, torque converters and other power components of construction machinery.

(Continued on page 55)

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(Continued from page 52)

Allis-Chalmers' New Catalogs Hail "safety-first" features Of Diesel Fork-Lift Line

Offering safety diesel lift trucks for operation in hazardous locations, Allis-Chalmers describes models "years ahead" in engineering advantages. The new 2-page catalogs, BU-638 and BU-481A highlight diesel lift trucks with protective devices such as non-ferrous fan blades, minimizing sparks from the contact of fan blades with foreign objects; static arrester cushion tires; water cooled exhaust manifolds, reducing the hazards of dust concentrates and volatile gas concentrations which may ignite on extremely hot surfaces; and hydraulic starters, replacing the conventional electric starter.

The trucks feature safe operator compartments, low center of gravity for short turns and ease of maneuverability. With capacities up to 10,000 lbs, operational and personnel safety are permitted at reduced insurance rates.

Use your dp Reader Service Card.

Manzel Publishes Complete Catalog of Force Feed Lubricators

Basic information on the principles of force feed lubrication and valuable engineering data on the viscosities of various lubricants are contained in a 44-page booklet, the result of 18 months' work by Manzel, a unit of Houdaille Industries, Inc.

Listing specific, detailed operating instructions of each type of lubricator, the catalog features and illustrates the many ways they can be adapted to specific equipment. Includes an easy-to-read chart offering a quick comparison of all the lubricators with reference to pumping unit characteristics, priming methods, drive types and locations and lubricants available.

Manzel, who originated force feed lubrication for steam engines in 1898, supplies literally every industry now providing correct lubrication for cylinders, bearings, packings, V-ways, slideways and other moving parts.

CAT Gets New Naming System

The new "Caterpillar Construction Equipment" 20-page catalog points up the tremendous scope of machinery now manufactured by the company as it adopts a new system of naming its products.

Crawler tractors and closely related equipment, will maintain the traditional designations, but others are being placed into a new 3-digit series that will allow for expected future growth. The 300 series, for example will refer to diesel engines and diesel electric sets. Catalog gives you a good idea of Cat's complete construction equipment line.

"For Safer Cleaner Air"

That's the name of the new booklet published by Oxy-Catalyst, Inc. describing exhaust purifiers specifically developed to kill dangerous carbon monoxide fumes and odors from Diesel-powered equipment. Knowing the ever-present silent threat of these deadly poisons in the confined work areas around this equipment, you will want to acquaint yourself with the attributes of the OCM Diesler, designed to operate on 4-cycle Diesel engines. When operating at 60% load or better, it can be expected to eliminate 60 to 85% of the carbon monoxide and the objectionable hydrocarbons and aldehydes as well as the smoke and odor normally associated with Diesel fumes.

Read about these purifiers with an eye to safer operation in plants, warehouses, underground.

Brulin's Brochure is Clean-up-Time Guide

With the re-issue of Brulin & Co.'s 8-page pamphlet, "Industrial Cleaning Compounds and Solvents," you can re-acquaint yourself with the entire line of industrial cleaning compounds manufactured by this firm, plus five new ones just added.

Clean up the whole shop or plant. And . . . most everything that's in 'em! Engines, motors, parts, and right through the garage or factory, on to heavy road equipment. Versatility, safety and economy . . . these are the features of the line, as reviewed in the easy-to-read booklet.

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phone: ORegon 8-7174
1601 West Florence Avenue, Inglewood, Calif.

(Continued from page 23)

A. H. Schott

New V.P. for Ohio Crankshaft

A. H. Schott, with **Ohio Crankshaft Co.** since 1941, has been elected Vice-President. Having held a number of important positions as Chief Process Engineer, Master Mechanic and Factory Manager, Mr. Schott was appointed General Manager of the company's Crankshaft and Camshaft Division in 1956. He will continue to direct this phase of the company's activities.

Manager for New Clark Bros. Dallas District Office

William A. Roever has been named manager of the newly-created Dallas District Office, according to **George W. Probst,** Vice-President-Sales, **Clark Bros. Co.** He will be responsible for the sales of Clark engines, compressors and gas turbines in the central part of Texas and the lower half of New Mexico, operating from the new office located at 4512 North Central Expressway, Dallas 6, Texas.

Mr. Roever has been with the Clark organization since 1946 as Sales Engineer, Dallas Branch manager and most recently, Senior Branch Manager.

Hawker Siddeley Brush . . .

Sales and service of Brush Electrical Equipment and Petters, McLaren, Armstrong Siddeley, National and Mirrless diesel engines formerly distributed by Orenda Industrial, Inc. will now be handled by **Hawker Siddeley Brush, Inc.** HSB will have its head office in New York with branch offices in San Francisco and Chicago.

Distributor Doings:

• In a circus atmosphere, with hundreds of guests from a four-state area on hand, **James H. Hoag,** President of **Ingersoll Corporation** announced from his home office in Shreveport, La., that his firm had been appointed as the new **Caterpillar Engine Dealer** for Arkansas and Northern Louisiana.

Exhibits at the Open House celebration ranged from a motion picture on Cat's new line of lightweight, compact engines to working cutaway models of these modern, 4-cycle engines. Mr. Hoag related plans for expanding parts and service facilities to continue top flight customer service. Application engineering and installation assistance will be provided through a subsidiary, Ingersoll Power and Fabricating Co. of Shreveport.

• **H. C. Ormes Construction Company** of Minneapolis, Minnesota has been appointed sales and service dealer for the **Eimco** line of crawler-tractors. Ormes will represent Eimco in the southern portion of the state —as far north as Pine, Kanabec, Mille Lacs, Marrison, Todd, Otterhead and Clay counties in Minnesota.

• Owners and service managers from 15 **Detroit Diesel** Distributorships and Dealerships in the Southwest, attended a one-day meeting in Dallas, Texas to exchange ideas, information, service procedures and methods, and "bone up" on new products, latest product development and distributor-dealer-plant relations.

Detroit Diesel's "Series 53" and "Vee" engines introduced last year enjoyed top priority during the seminar which was under the direction of **Chester B. Clum,** Detroit Diesel General Service Manager.

• Six new distributors have been appointed by **Mack Trucks, Inc.,** according to **J. B. Morehead,** manager, distributor sales division. They are: **Basil Whitman Motors,** Elba, Ala.; **Muscle Shoals Mack Sales,** Tuscumbia, Ala.; **Southwestern Truck Sales,** North Little Rock, Ark.; **Heuer Equipment Co.,** Marshalltown, Iowa; **Mack Truck Sales** of Joplin, Joplin, Mo.; and **Rice Motors,** Billings, Mon.

• **Anderson-O'Brien Co.,** GM Diesel Distributor, Los Angeles, has opened a new branch office in El Cajon, California, with a service area equipped to provide diesel service for all types of construction, marine and industrial equipment. New branch services Orange, Riverside, San Diego and Imperial counties. Staff includes **Ed Steckline,** parts manager; **John Sullivan,** service manager; **Jack Deakins,** sales representative; and **Ray Banning,** service representative.

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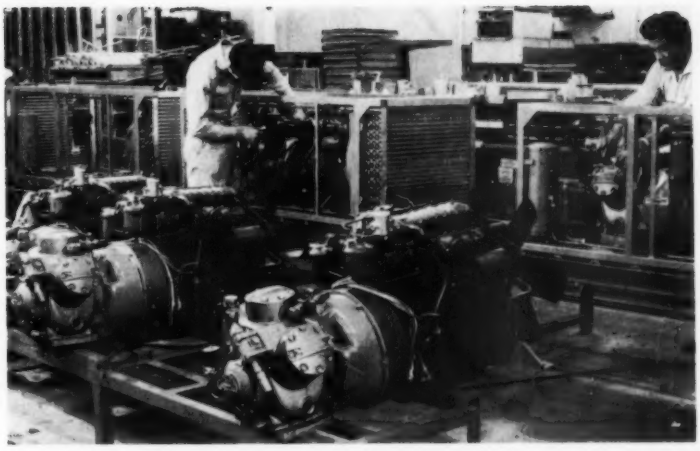
Diesels Freeze Foods . . .

(Continued from page 39)



Generator is bolted to special bell housing provided by Perkins. 3-cyl compressor has an aluminum body, rated at 7½-tons, 1750-rpm.

230's in operation—some with as many as 3000-hours operating time—maintenance cost has been far below those of the gasoline-driven reefers.

Western-Gillette vice president Tom Rafael compared the gasoline-powered and diesel-powered 7½-ton refrigerators. He noted that where the gasoline engine (burning nothing but white gas) had heads removed and carbon scraped after 500-hours and a complete overhaul at 2500-hours, the first diesels (with 3000-hours on them) have required little more than valve and injector cleaning and adjustments.

There are an estimated 35,000 to 40,000 refrigerated trucks and trailers currently in use in this country, and all but the newest of these are cooled by gasoline or butane-powered refrigeration units. With increasing use of frozen foods and the increasing attention given to the maintenance of 0°F temperature for frozen fruits, vegetables, and meats from processor to market display case, it is certain that a sizeable percentage of these refrigeration units will be up-graded during the years to come. It's a big, important market that's opening up for small diesels . . .

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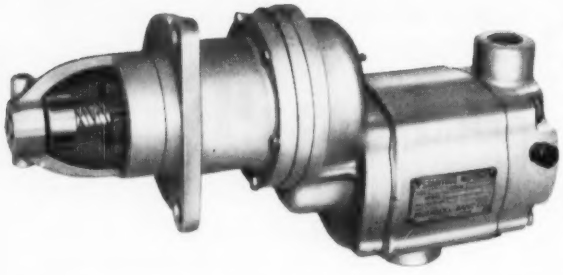

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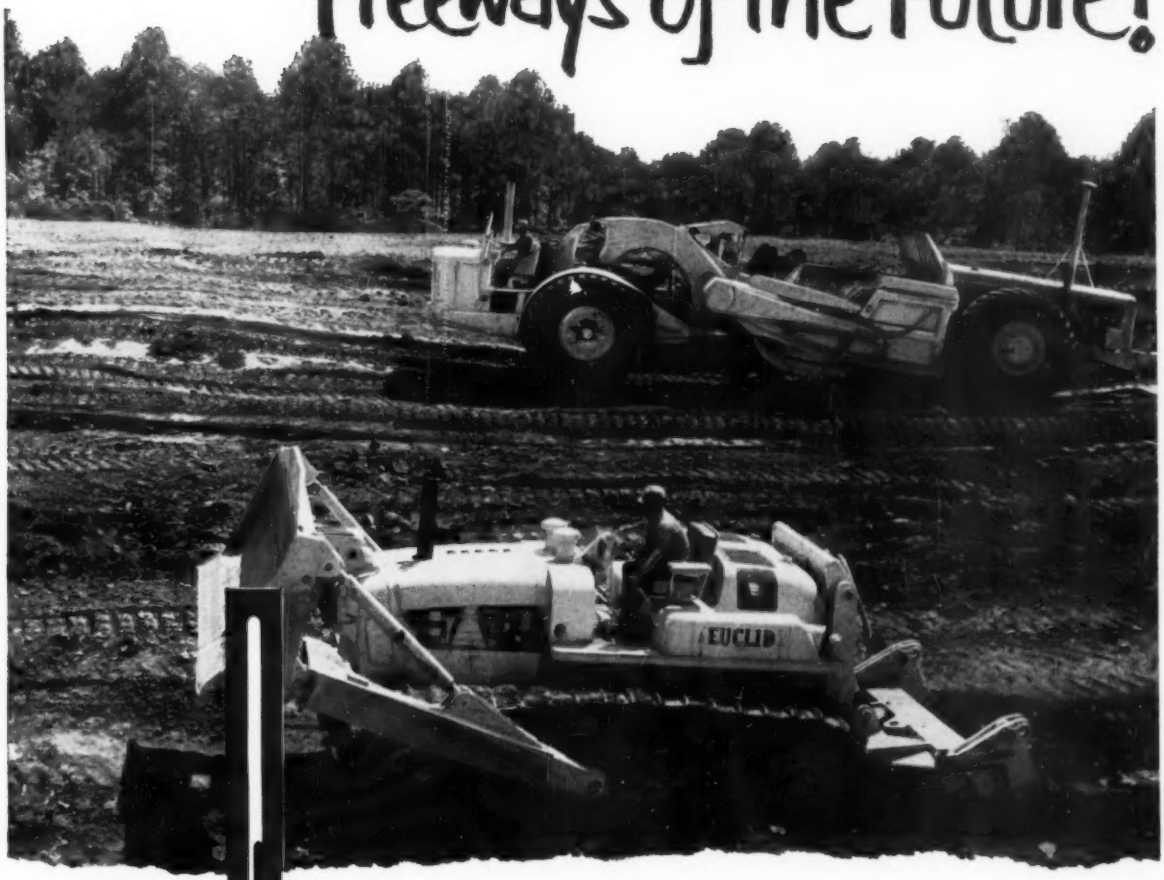

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